

MARINE REVIEW.

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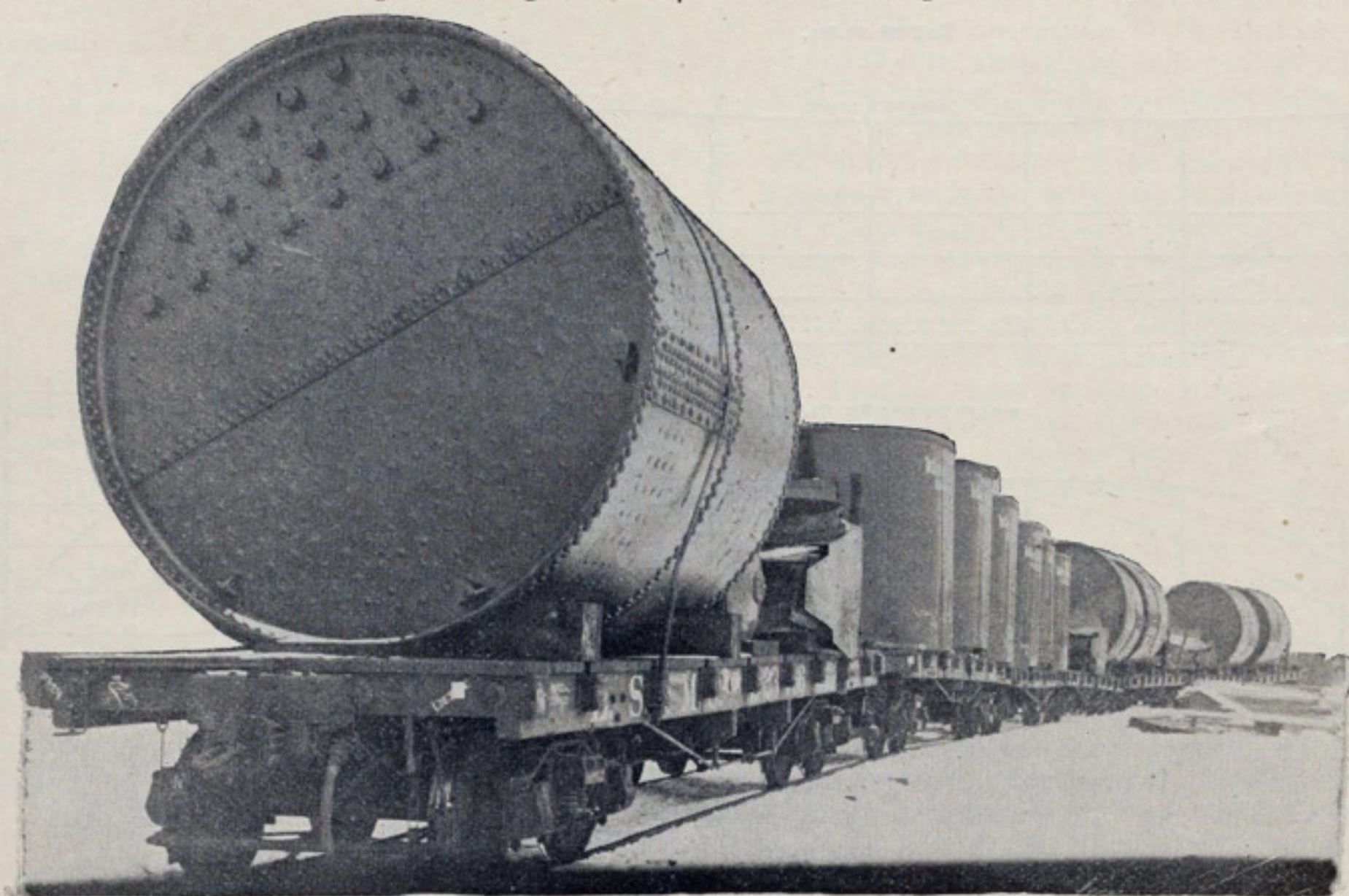
Boilers and Stacks for the Columbus.

So far as known the illustration herewith shows the largest single consignment of marine boilers and stacks ever shipped from a lake boiler building establishment. It consists of eight cars, loaded with six Scotch boilers and ten lengths of stack. The six Scotch boilers are each 11 feet in diameter and 12 feet long, and allowed 160 pounds pressure, and each has two corrugated furnaces, 44 inches outside diameter. Each boiler has a steam drum 3 feet diameter and 5 feet long with bumped heads. The stack is oval, $7\frac{1}{2}$ by $9\frac{1}{2}$ feet and is 48 feet above breeching. The casing or jacket for stack is $9\frac{1}{2}$ by $11\frac{1}{2}$ feet, breeching stack and casing all being steel. The boilers are for the world's fair steamer Christopher Columbus, recently launched at West Superior, Wis., and are to be placed three on each side of the boat, making the fire room fore and aft. The weight of boilers, stacks and casing combined was over 196 tons. The contract for this work was taken by the Cleveland Ship Building Com-

there are any profits in the business they will eventually go back to the shippers.' This is all very well, but perhaps the members of this mutual company, or 'combination,' will discover that the old-fashioned system of adjusting rates to selected risks is materially better in the end than the mutual system of taking anything and everything, and working out the result into an even percentage of contribution by the members. No doubt the grain shippers on the lakes are much too conscientious to take up any old rattle-trap simply because the cargo carried by her can be insured on the mutual system at the rate payable for the very best steamer on the lakes; nevertheless, there will be some amount of temptation to ship by the poorest and cheapest class of tonnage."

England has the Ships, but no Salvors.

Prominent as England is in maritime affairs, it is odd that in one of the most useful and necessary branches it should lag far behind other powers. Considering the vast amount of capital



LARGEST SINGLE CONSIGNMENT SHIPPED FROM A LAKE BOILER SHOP.

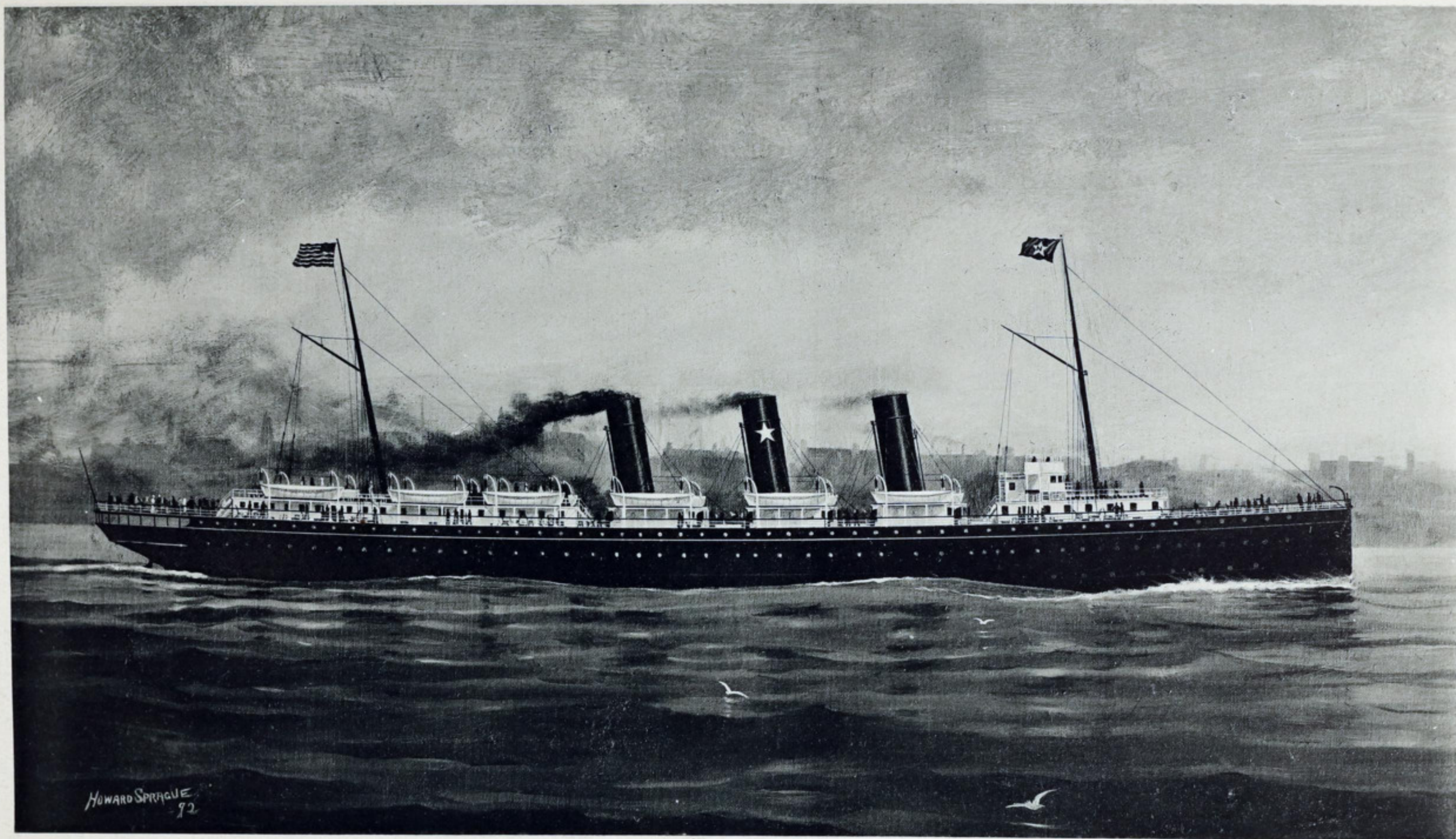
pany July 20, and it called for delivery to the American Steel Barge Company Dec. 15, but the eight cars arrived there Dec. 3.

Not a Great Combination.

The Chicago Insurance Company, organized a short time ago to engage in grain cargo business, has a capital of only \$100,000 and is not a very powerful concern, but its stockholders are grain shippers and vessel owners, and on this account there has been some talk of the new corporation monopolizing the cargo business of the lakes. The daily newspaper articles about this company have brought out the following from a writer in Fairplay of London, who discusses very intelligently in that publication affairs at Lloyds, the great center of insurance business for the world:

"At Chicago a 'combination' has been got up for underwriting cargo risks on the lakes. It has been authorized by the state auditor to begin business, and according to an American paper 'it may completely upset the present method of insuring cargoes.' The object is to save agents' commissions, so that, 'if

invested in shipping, the number of vessels owned in our country, and the recognized fact that the English mercantile marine are the carriers of the world, it is ridiculous that when any important salvage operation has to be undertaken, Englishmen appear to be unable to meet the emergency. Lloyds and the various London insurance companies annually pay thousands of pounds for assistance rendered to stranded vessels in which they are interested, and it might have been supposed that sufficient occupation could have been found for at least one English salvage steamer well built up to modern requirements. Foreign salvors are now working not only in their own but in English waters. It was not English enterprise that raised the Sultan. The Eider was floated by Swedish and German salvors, and some of the same vessels which so successfully took this ship off the dangerous rocks at the back of the Isle of Wight are now engaged to render a similar service to the Howe. The Hermes and the Belos, which went to Ferol to raise the English war ship stranded there, carry appliances for salvage operations which no English vessel possesses, and the Neptune Salvage Company, to whom they belong, yearly earns many thousands of pounds from English insurers in the Baltic and elsewhere.—English Exchange.



Supplement to MARINE REVIEW, Cleveland, Ohio.

Building by the GLOBE IRON WORKS CO.

ONE OF TWO TWIN-SCREW LAKE PASSENGER LINERS.
(NORTHERN STEAMSHIP COMPANY.)

Laying Down.

Almost every person who has never seen a vessel before remarks, what a graceful or handsome vessel, etc.; few there are however, who understand how the evenness or fairness is obtained.

It is the intention to here give a few outlines of the operation of how this evenness or fairness is produced. Although many of the details will have to remain unexplained in this paper at this time, "laying down," as it is called in ship-building, consists of drawing on a floor the lines or shape of the vessel to the full size.

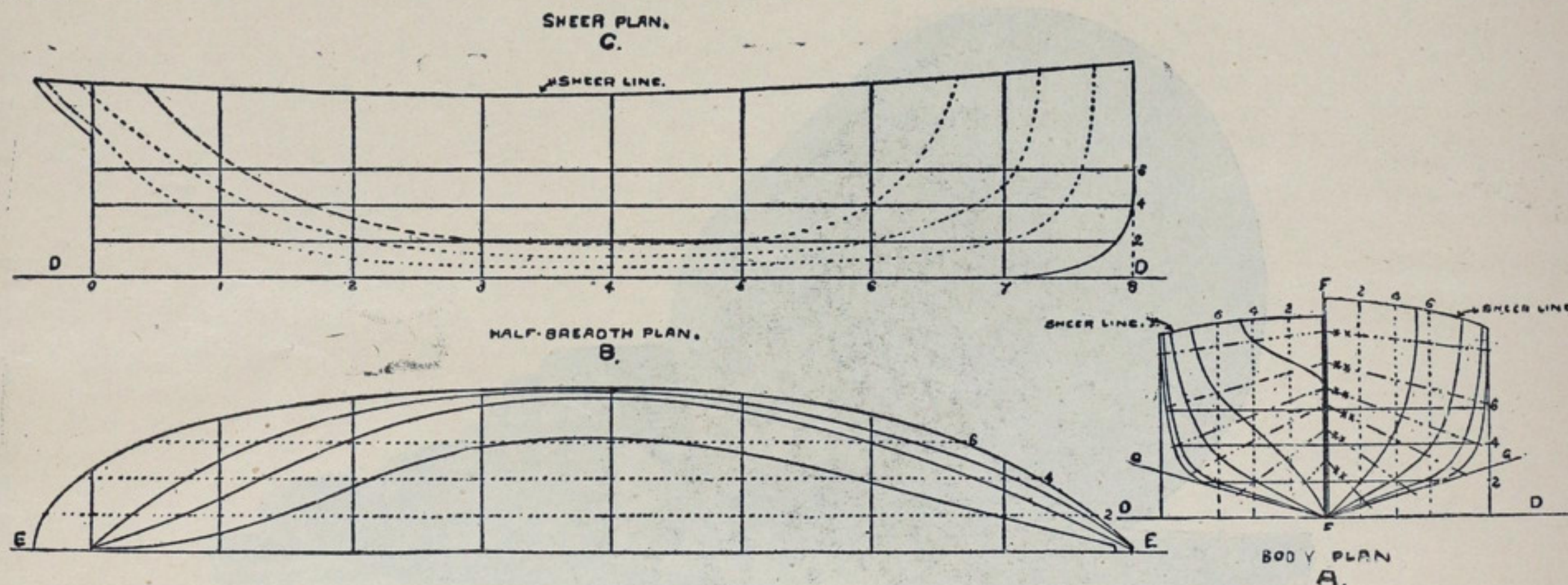
In order to do this, the vessel is represented as being cut in sections, usually three ways: First, crossways, Fig. A; second, on level or parallel lines with the water line, Fig. B; and third by vertical section or parallel lines with that through the keel, stem or stern post, Fig. C. These sections are, as shown, first, the body plan, which forms the most prominent part and represents the vessel as being cut crossways of the keel. Second, the breadth plan, which represents the vessel as being cut by parallel lines with the water line. Third, the sheer plan or a longitudinal view, supposing a vessel to be divided or cut right through centre, and looking at one of the halves where divided. These three plans combined are what is generally known as the draught of a ship. Without due attention and accuracy in laying down, it is almost impossible to obtain a good form of vessel and insure fairness; nor could the architect without them give any statement of the probabilities of the behavior or speed, or estimate accurately the weight of the structure, carrying capacity or cost.

the scale and compiling the table, as well as in the setting off in the loft. The table is usually made to read feet, inches and eighths of an inch. If measurement is a trifle more than $\frac{1}{8}$ the sign + is added and if less the sign - is added; thus 12, 3, 7- would be 12 feet, 3 inches and $\frac{7}{8}$, full.

Now strike or mark on the floor a straight line DD, as shown on body plan. This is called the base line. Next erect a line at right angles to base FF on body plan. This line will be the centre line of vessel. Make parallel lines with base line DD, 2, 4 and 6 feet apart. These are termed water lines. Now set off parallel lines on each side of centre line. They are usually dotted on the body plan. Also put a line each side of centre for breadth of ship and then set off FG, which represents rise of floor.

Next we strike a level line EE, which will represent centre of ship, and run parallel lines at 2 feet, 4 feet and 6 feet apart. Of course we assume in this case only 3 sections, lines 2 feet apart, but number and spacing may be lessened or increased to suit size of vessel. At base line on plan B set off frame sections 0, 1, 2, 4, 5, 6, 7, 8, at right angles to base line. They generally represent every sixth frame, but can be varied according to shape of ship. The 0 and 8 in this case are called the after and forward perpendiculars. In plan C, sheer plan, we mark off DD, and draw lines parallel to base 2, 4 and 6 feet asunder; they are termed water lines same as on plan A, body plan. Next set off frame sections on vertical lines 0, 1, 2, 3, 4, 5, 6, 7, 8, at right angles to base; space and number similar to those on half breadth plan. When this is finished, all the fixed lines are established on floor.

It is customary in laying off the sheer and half breadth



To commence to lay a vessel down, the first thing necessary is a level (or nearly so) floor. It need not be so long that the whole length of the vessel may be represented at full length, but must be wide enough to take the full width and depth of the vessel.

Some of the government navy yards have lofts of sufficient size for the full lengths of the largest vessels, but in general use this is not the case.

Next, a measuring batten or pole is to be made, and this pole is to be the standard for all measurements both in this work and in the building yard. It is very important to establish this at the very outset. Now make a long batten or pole about 2½ inches by ¾ inch thick, that will extend the entire length of the floor, to be used for sheer line, or those not requiring much curve, and known as the sheer batten. Also one about 1¼ inches by ¾ inch thick, suitable for being used on greater curves and known as the water line batten. Also one about ¾ inch by ½ inch thick and known as the body plan batten.

It will be found convenient to have at hand several smaller battens, with the sizes reduced and the ends tapered for use on special curves. A number of large awls should now be made for holding the battens in place; some loft men, however, prefer nails sharpened to a point for this use; also have chalk of two or more colors, and wide pencils.

Having decided on a satisfactory plan or model, to transfer the same to the floor, you will begin, first taking the measurements from the plan or model by a scale in the same manner as they are to be placed on the floor. In doing so it is customary to make a "table of ordinates." Much labor will be saved in the loft room by using great care and accuracy in reading

plans, to make base line DD serve as the base line EE for the half breadth plan (or in other words, having sheer plan C and half breadth plan D made as one plan). By this means half the floor space only is required.

Where mould loft is rather short to admit of vessel being laid down full length, the vessel may be contracted, that is, frame sections are placed half the proper distance asunder. In vessels with very fine lines it is advisable to contract the length, especially at the ends, as it causes the lines to show more of a fullness or curve, and consequently the battens will give a quicker curve, and detect errors in setting off any uneven places in the lines.

From "table of ordinates" mark sheer spots at all the section lines on sheer plan C, and with long batten draw the sheer line fore and aft, using a piece of chalk. From "table of ordinates" mark points for stem at each water line, and measuring forward from frame section 7, place a batten on the points obtained and draw in curve for shape of stem; also from table mark off stern points at certain level lines parallel with water line and draw in curve by the aid of a batten. From the table, set off on body plan A half breadth at 2 feet water line, also half breadth at 4 feet and 6 feet water line, and half breadth and height of rail for midships frame section 4. Nail or pin a batten down to the points already obtained and see that the curve is fair, and then draw it with a chalk or pencil. Next take frame section 5, mark half breadths at the various water lines and rail, and draw through points with batten as before.

Proceed and line in all the other frame sections on body plan in similar way as 4. If batten does not pass exactly through spots do not force it back to spots, but see that the curve is fair; height of foot of 7 section line to be taken from 7 section line

on sheer plan. Again take the half breadth of 6 feet water line at the various frame sections on body plan A, and transfer them on to half breadth plan in this method; lay batten on frame section 4 and mark off water line points, then transfer batten onto 5 frame section line and mark off water line points, and so on until you have points on each frame section transferred on half breadth plan. Pin batten down to pass through points and mark in water lines. Transfer all other water line points from body to half breadth plan in like manner, and run in lines; also the width of deck lines to be treated similar to water lines. The ending of water lines on half breadth plan are transferred from plan where each water line intersects stem and stern lines.

Now fair and prove the water lines by the vertical longitudinal sections, already marked by dotted lines on body and half breadth plans. Transfer heights from the base line of body plan A, where the transverse sections intersect line on the same frame station. Points may also be transferred from half breadth plan to sheer plan for the development of the vertical longitudinal section. When water lines on half breadth plan intersect dotted vertical longitudinal section lines, these points would be squared up to the sheer plan, and where they intersect the corresponding water lines a batten should be fastened down and a line run in. Any change of the lines in one plan makes a corresponding change in the two other plans.

It is customary to test correctness of form by running diagonal lines as shown on body plan and marked XX. The process of fairing the ship by diagonal lines instead of water lines is much the same. Take offsets from diagonal in the same way as with water lines on the body plan and transfer them onto the half-breadth plan. The difference in running these lines from water lines is principally in establishing the point from which measurements are to be taken.

Where the batten does not pass through points marked, the new distance should be transferred back to the plan from which it was taken, and a new line drawn, so that all the points when transferred from one plan to another will agree. After having proved that all water lines, frame section lines and diagonals meet their corresponding marks in the several places, the vessel has been faired.

Up to this point we have only obtained the form of the vessel and the shape of certain frames. The intermediate frame lines can now run in on the half-breadth and sheer plans, stern cant, longitudinal, keelsons, rib-bands and floors. Deck lines and edges of outside plating require to be marked off on the various plans and faired, and the method to be pursued is similar to that already described.

Some draughtsmen use a shortened or contracted method for fairing. Thus, a few frames evenly spaced are put in the body plan on the floor from model or table at once. They then take a board about 8 inches wide by 3 feet long, and square marks across the same about $\frac{1}{2}$ inch apart, each mark representing a frame section. On this set-off from the edge of board, the edge being used as the first water line, (not as a centre line) the first line run will represent the second water line, or, in other words, the difference in the increase in width of water line. This is continued up to the widest water line.

Beveling of frames is a term often alluded to, which means the amount of angle which must be put on the outside of frames, in order that the same, if extended, would meet the adjacent frame. These angles are taken from the floor, and placed on small boards, known as "bevel boards."

There are many other-lines employed in the mould loft work not referred to herein, such as buttock and bow lines, deadwood lines, bearding or stepping lines, rabbet lines and rib-band lines, but they are used for special purposes, and have reference to some local portion of the structure of the vessel, such as the shaping of the knight-heads, counter frames, hawse pieces, cant frames, etc., the detail of which would require too much time and space for this article.—C. H. Simonds, N. A., in Chesapeake Marine Gazette.

At the annual meeting of the Anvil Mining Company, held at Milwaukee, the following officers were elected: President, Gage E. Tarbell of Chicago; vice-president, Frank J. Kipp; treasurer, Rudolph Nunnemacher; secretary, E. A. Conrad. About 50,000 tons of ore were shipped from the company's mine during the past season.

A new marine light which will soon be in place near Havre will be the most powerful in the world. It will be visible at sea, a distance of from twenty-two to fifty-two miles, according to the condition of the weather.

Iron Mining.

VALUE OF LEADING STOCKS.

Quoted by Chas. H. Potter & Co., No. 104 Superior St. Cleveland, O.

| Stocks. | Par Value. | Bid. | Asked. |
|--|------------|---------|----------|
| Cleveland-Cliffs Iron Company..... | \$100 00 | \$..... | \$ 55 00 |
| Champion Iron Company..... | 25 00 | ..... | 37 50 |
| Chandler Iron Company..... | 25 00 | ..... | 42 00 |
| Jackson Iron Company..... | 25 00 | ..... | ..... |
| Lake Superior Iron Company..... | 25 00 | ..... | 36 00 |
| Minnesota Iron Company..... | 100 00 | 64 00 | 68 00 |
| Pittsburgh & Lake Angeline Iron Co.... | 25 00 | ..... | 135 00 |
| Republic Iron Company..... | 25 00 | 9 25 | ..... |
| Ashland | 25 00 | ..... | ..... |
| Section Thirty-three..... | 25 00 | ..... | 4 00 |
| Brotherton..... | 25 00 | 2 00 | ..... |
| Iron Belt..... | 25 00 | ..... | 2 00 |
| Aurora..... | 25 00 | ..... | 9 00 |

ONE mining company, the Brotherton, Gogebic range, this week surprised its stockholders with an announcement of a dividend of \$1 a share, fifty cents of which is payable on January 3, and the other half March 3. The Brotherton shipped 140,000 tons of ore during the past season from Ashland and Escanaba. A part of this ore was of last year's product, but the mine is nevertheless understood to be in a condition to duplicate next year the shipments of 1892, if the market will warrant it. The Minnesota company's regular dividend will also be paid Jan. 3, and a division of about \$1 a share is expected from the Aurora in February. Excursions are still being made by large parties and individuals to the Mesaba where it is reported that severe winter weather is delaying development work somewhat more than was expected, but there is no news of special importance outside of the operations of the Duluth & Iron Range Railway or Minnesota Iron [Company, of which the railway is a part. At Two Harbors, Minn., additions to be made this winter to the docks of this company already in operation, and the construction of one new dock, to be known as No. 3, will increase the storage capacity from 55,000 to 90,000 tons. Reports of a survey for a new Mesaba branch line from some point on the Iron Range road to a new port on Lake Superior are also confirmed.

Following are some late quotations on Mesaba iron stocks from the Duluth stock exchange:

LISTED IRON STOCKS—Biwabik Mountain Iron Company, \$45; Cincinnati Iron Company, \$2.50; Great Northern Mining Company, \$10.50; Little Mesaba Iron Company, \$5.00; Mountain Iron Company, \$100; Mesaba Mountain Iron Company, \$22; Shaw Iron Company, \$3.25; Washington Iron Company, \$4. Unlisted Iron Stocks—Allegheny Iron Company, \$1; Aurora Iron Company, \$1; Charleston Iron Company, \$1.25; Champion Iron Company, 60 cents; Dayton Iron Company, 25 cents; Great Western Mining Company, \$3.50; Horton Iron Company, 10 cents; Homestead Iron Company, 10 cents; Lackawanna Iron Company, 50 cents; Mesaba Chief Iron Company, \$5; McCaskill Mining Company, 20 cents; Myrna Iron Company, 50 cents; Northern Light Iron Company, 50 cents; Ohio Mining Company, \$10; Oneota Iron Company, 10 cents; Pennsylvania Iron & Steel Company, 50 cents; Rouchleau Iron Company, 75 cents; Republic Iron Company, \$1.25; Red Hematite Iron Company, 30 cents; Standard Ore Company, \$8; Towanda Iron Company, \$3; Zenith Iron Company, \$4.50.

Another Combination with the Barge Company.

Capt. Alex. McDougall and the Merritt brothers, leading owners of Mesaba range mining properties, who control the Mountain Iron mine, which shipped two cargoes of ore last season and which is one of the most important properties on the range, have been in New York consulting with the eastern directors of the barge company, who have furnished so much money for the big West Superior ship building enterprise. On his return Capt. McDougall announced that another big installment of money will be immediately applied to the building of more barges. Details are not given out, but it is understood that the barge company has concluded an agreement with the Mesaba mine owners, probably in the way of stock in the barge company and an advancement of some money for mining operations, whereby the new boats to be built, as well as those already in commission, will have additional assurance of plenty of ore to carry in the future. This arrangement, if it is interpreted rightly, will add to the control of business which the American Steel Barge Company already enjoys, through the relations of its stockholders to the Gogebic range mining companies coming under the management of the combination known as the Wisconsin Central syndicate.

Buffalo Harbor Matters.

Special Correspondence to the MARINE REVIEW.

BUFFALO, N. Y., Dec. 29.—The dissolution of the Lake Superior Transit Company, which was announced two or three days ago, may mean what it is announced to mean, a mere conclusion that the component parts of this consolidation of intercesses can be run to better advantage separately, and it may mean a good deal more. There was always more or less friction in the company, which was at first made up of the Western, Anchor and Union lines, each contributing as many boats as it pleased, and three years ago the Union line withdrew. Last season it was instrumental in forming the Union Transit Line, which ran five boats to Lake Superior. The lake propeller lines are in anything but a happy family when co-operation in holding up rates is the question at issue, though the all-rail lines are given most of the credit of rate cutting. The Canadian Pacific so persistently cut west-bound Lake Superior rates last summer that the Northern Steamship Company at last met them and made a season rate of 42 cents, New York to St. Paul.

Buffalo's strenuous objection to the narrowing in of the long breakwater and reducing the outer harbor to about a mile and a half frontage, is already justified by recent developments. Not only has the big syndicate for developing a wide frontage beyond the Tift Farm, with the Lackawanna Railroad said to be behind it, been brought to the surface the past week, but the \$1,000,000 Gatling gun plant, to be built on the shore still further out, is already a fact. The Government should drop the small harbor nonsense before it is too late.

There is evidence on the quiet that the elevator pool is going to meet with still more outside competition than was developed last season, when about 16,000,000 bushels of grain were handled at half rates by wild elevators, with a total handling of 133,000,000 bushels for the season. This is not a very large percentage, but it would not be pleasant to greatly increase the outside business. The regular charges would do well to come down, rather than suffer a very large division.

The underwriters special committee for devising rules governing the construction of steel steamers has not begun active work yet. Chairman Sandrock is still busy fixing up season losses, but will soon set about the new problem.

It seems rather curious that the Government should order plans to be drawn for improvements to the harbor at Dunkirk and then withdraw them. The bids were to be opened next Friday.

This may not be a great shipbuilding center, but it is keeping up its end very well this winter. Besides the steel steamer for the Lake Erie line there are four tugs and a large excursion steamer on the stocks.

Did the Gilcher Take the North Passage?

EDITOR MARINE REVIEW: Capt. Samuel Dodd, keeper of the White shoals light ship, who is now ashore, claims that the steamer Gilcher on her fatal trip passed White shoal between 2 and 3 o'clock in the afternoon, and took the north passage. He says he knew the Gilcher very well, and although he may have been mistaken in the boat, he is strongly of the belief that such is not the case. If Capt. Dodd is right, then the story of the boat breaking in two is certainly out of place, as no sea could make in that passage, with a north-west wind, to cause her to break in two. Is it not possible that she might have been in collision or struck on the north end of Little Gull island, sprung a leak and foundered afterward in trying to make High island, which would account for the reported find of wreckage on that island by Capt. Neal Gallagher. I know both of these men, and they are thoroughly reliable. It seems to me it would be well to follow up Capt. Dodd's reports. I will write to Capt. Neal Gallagher to find out what he knows of the wreckage at High island. He resides at St. James, Mich., a postal station on Beaver island.

E. A. BOUCHARD.

Cheboygan, Mich., Dec. 26.

Annual Meeting of Naval Engineers.

Special Correspondence to the MARINE REVIEW.

WASHINGTON, D. C., Dec. 29.—The annual meeting of the American Society of Naval Engineers was held in the office of the engineer-in-chief of the navy a few evenings ago. The report of the secretary and treasurer showed the society to be in a flourishing condition with a balance of nearly \$1,200 on hand. The membership is now about 400. The election of officers resulted in the choice of Chief Engineer H. Webster as president, Passed Assistant Engineer W. M. McFarland as secretary and treasurer, and Passed Assistant Engineers F. H. Bailey and J. N. Hollis and Assistant Engineer W. W. White as members of the council. Passed Assistant Engineer Hollis read a paper of much interest on "The Influence of the Economy of Auxiliaries on Economical Speed," on the conclusion of which a vote of thanks was tendered him.

It is stated at the navy department that Secretary Tracy may award to the Union Iron Works of San Francisco the contract for one of the two war ships, bids for which were recently opened. The bid of this company was slightly higher than that of the Cramps, but the difference allowed for construction, between the east and the west, 3 per cent., would more than wipe out the excess of the Union Iron Works' bids. The contention is strongly urged that the Union company should be given the contract for one of the vessels, under the supposed intention of congress that at least one of them should be built on the Pacific coast. Mr. Scott, president of the Union company, and Mr. Charles H. Cramp, the head of the Cramps, have both been in the city for

some time, and each will exert every influence to secure the contract. Although there are good reasons for dividing the work, the legal side of such a move must be considered.

Report of Engine Trials of Steamer Pioneer.

This trial was made for the purpose of observing the economical working of the machinery, and the run was from Buffalo to the "Dummy" a distance of 200 miles. The steamer was light. Indicator cards were taken every hour. Boilers worked with Howden's forced draught, and the fuel used was good quality of lump coal and was weighed on platform scales. The steering engine was in use during the trial, and the electric light engine was running eleven hours. The record is as follows:

| Time. | Revolution Counter. | Guages, | | Fan, Engine Revolutions. |
|-------------|---------------------|------------|----------------|--------------------------|
| | | Steam lbs. | Vacuum inches. | |
| a 2:46 p.m. | 29,385 | 140 | 22 | 148 |
| 3:30 | 33,075 | 145 | 21.25 | 182 |
| 4:00 | 35,588 | 146 | 21.25 | 182 |
| 4:30 | 38,164 | 149 | 21.25 | 162 |
| 5:00 | 40,753 | 145 | 21.25 | 162 |
| b 5:30 | 43,268 | 135 | 21.5 | 162 |
| 6:00 | 45,845 | 143 | 20.75 | 162 |
| 6:35 | 48,852 | 152 | 20.75 | 181 |
| 7:00 | 51,045 | 144 | 21.25 | 180 |
| c 7:24 | 53,102 | 149 | 21 | 180 |
| 7:40 | 54,496 | 140 | 21 | 181 |
| 8:00 | 56,256 | 147 | 21 | 180 |
| 8:38 | 59,602 | 143 | 21 | 170 |
| 9:00 | 61,478 | 143 | 21.25 | 172 |
| 9:30 | 64,106 | 146 | 20.75 | 175 |
| 10:00 | 66,746 | 140 | 21.25 | 178 |
| 10:32 | 69,473 | 146 | 21.5 | 178 |
| 11:00 | 71,887 | 135 | 21.5 | 174 |
| 11:34 | 74,731 | 144 | 21.25 | 176 |
| 12:11 a.m. | 77,927 | 135 | 21.5 | 175 |
| 12:37 | 80,118 | 148 | 21.25 | 171 |
| 1:07 | 82,753 | 143 | 21 | 174 |
| 1:35 | 85,208 | 143 | 21.25 | 176 |
| 2:15 | 88,724 | 147 | 21.25 | 168 |
| 2:45 | 91,222 | 135 | 21.75 | 194 |
| 3:30 | 95,072 | 145 | 21 | ..... |
| 4:03 | 97,890 | 140 | 21 | 175 |
| d 5:22 | 104,768 | 146 | 21.5 | 170 |

a—Passed Buffalo light.

b—Steam ran up to 145 in five minutes.

c—Abreast of Long point.

d—Abreast of "Dummy."

During the run from Buffalo to Long point, the H. P. valve gear was linked up $3\frac{1}{4}$ inches, the I. P. 1 inch and the L. P. $\frac{3}{4}$ inch. At Long point the H. P. cut was changed to $2\frac{3}{4}$ inches, the intention being to make the run to the "Dummy" at a higher speed, but the steam pressure did not keep up, the power developed remaining almost the same after as before changing cut. Following are results of the trial:

| | |
|---|---------------------------|
| Date of trial | Oct. 31 and Nov. 1, 1892. |
| Draught of steamer at Buffalo, forward..... | 4 ft. 3 in. |
| " " " " aft..... | 12 ft. 9 in. |
| " " " " mean..... | 8 ft. 6 in. |
| " " " " at "Dummy," mean, estimated..... | 8 ft. 5 in. |
| Mean draught during trial..... | 8 ft. $5\frac{1}{2}$ in. |
| Duration of trial..... | 14 hours 36 minutes. |
| Distance run, Buffalo to "Dummy"..... | 200 miles |
| Speed, mean..... | 13.7 miles |
| Type of Engine..... | Triple |
| Cylinder, diameter H. P..... | 20 inches |
| " " " " I. P..... | 33 " |
| " " " " L. P..... | 54 " |
| Stroke..... | 42 " |
| Boilers, Scotch, number..... | 2 |
| " " " " diameter..... | 12 feet |
| " " " " length..... | 11 feet 6 inches |
| Furnaces, total number..... | 4 |
| " " " " diameter..... | 43 inches |
| Heating surface, total..... | 3,102 square feet |
| Grate surface, total..... | 82 square feet |
| Ratio of heating to grate surface..... | 37.7 |
| Mean boiler pressure..... | 143.8 pounds |
| Mean vacuum in condenser..... | 21.25 inches |
| Revolutions per minute, mean..... | 86.5 |
| " " " " for engine, mean..... | 172.5 |
| Indicated horse power, mean H. P..... | 254.86 |
| " " " " " " I. P..... | 301.42 |
| " " " " " " L. P..... | 315.49 |
| Total indicated horse power, mean..... | 871.777 |
| Coal burned, entire run..... | 25,901 pounds |
| " " " " per mile..... | 129.5 " |
| " " " " per hour..... | 1,774 " |
| " " " " per square foot of grate per hour..... | 21.62 " |
| " " " " " " of heating surf. pr hour..... | 0.572 " |
| " " " " per indicated horse power per hour..... | 2.04 " |
| Heating surface of boiler per I. H. P..... | 3.56 square feet |
| I. H. P. per square foot of grate..... | 10.63 |

A report similar to the above regarding a trial of engines of the steamer Cadillac, owned by the same company, the Cleveland-Cliffs Mining Company, was published in the last issue of the REVIEW. The Pioneer was built by the Detroit Dry Dock Company and engined by the Dry Dock Engine Works.

War Vessels on the Lakes.

Although much of the telegraph matter relative to the maintenance of war vessels on the great lakes now being sent out from Washington and printed with extensive comment all over the country, is sensational in the extreme, it is evident that the agreement between the governments of the United States and Great Britain limiting the naval force of each on the lakes will be the subject of discussion in congress, with the probable result of modifying that agreement. It is not probable, however, that the agreement will be terminated, so as to prompt, on the part of either government, such an expensive undertaking as the construction and maintenance of a large fleet of vessels of war. In preventing this expense in the past, the treaty has proved a most wise measure, and the sensational portion of the present agitation of questions involved, which is based mainly on an effort in the treasury department to secure appropriations for two revenue cutters for the lakes, will not have the effect of terminating the entire agreement. Lieut. George L. Corden's reports relative to the three Canadian vessels built at Owen Sound, Ont., were made for the purpose of influencing legislation favorable to the building of two revenue cutters recommended by the treasury department, and must be so considered. Still, the reports on the manner in which the stipulations have been evaded by the Canadian government and the counter claims of evasion by the United States, show conclusively that the agreement no longer effects the purpose designed, and the United States can, without any show of hostility, seek a modification of the treaty suited to the changed conditions. The revenue cutters for which appropriations are asked from congress are needed, and the agreement can be so changed as to admit of their construction, but the great aim in the modified agreement should be to give to the well-equipped ship yards of the lakes the right to construct vessels of war for deep water service. As showing how the treaty stipulations have been evaded, we print the following review of the subject from an article in a recent issue of the Cleveland Plain Dealer by Mr. J. H. A. Bone, who is very well informed on such matters:

"As was pointed out in these columns some time ago, the compact of 1817 is not technically a treaty, but an exchange of letters between the British minister and the acting secretary of state at that time. The promise was given on either side that 'the naval force' to be maintained 'upon the American lakes' according to the British letter, or 'upon the lakes of the United States and Great Britain' as the American letter had it, should thereafter be confined on each part to one vessel on Lake Ontario, two on the upper lakes, and one on Lake Champlain, the maximum tonnage and armament of each vessel being 100 tons and one eighteen-pound cannon. The agreement was terminable on six months' notice by either side.

"Who first violated the agreement is a disputed question. An act of congress passed Sept. 9, 1841, provided for the construction and armament of such armed steamers or other vessels for defense on the northwestern lakes as the president may think most proper, and under authority of this act the Michigan was built at Pittsburg and carried in pieces to Lake Erie. In 1844 she was launched on the lake. Both the tonnage and armament being in excess of the stipulations in the agreement of 1817, the British minister, Mr. Pakenham, made protest under date of July 23, 1844. Six weeks later Secretary Calhoun replied in a conciliatory tone, calling attention to reports received from naval officers of the United States that the British had then upon the lakes two formidable war vessels, the Mohawk and the Cherokee. Nothing came of this correspondence and no further action was taken until April 8, 1857, when Lord Napier informed Secretary Cass that the British government had been advised that an American armed vessel lay in the Detroit river, from which it made frequent incursions into the lakes, and that the vessel was of greater dimensions and armament than permitted by the agreement of 1817. Fifteen months later Lord Napier made another complaint of reported violation of the agreement by the construction of six armed revenue cutters for United States service on the lakes. No reply was made to this communication, the government holding that revenue cutters under treasury control do not belong to the 'naval force' contemplated by the agreement.

"With the breaking out of the civil war and the consequent strained relations between the United States and Canada the old

difficulty was revived. In the latter part of 1861 Lord Napier once more complained of the Michigan, but was reassured by a note from Secretary Seward. In the spring of 1864 the British minister called upon Secretary Seward for explanations concerning the proposed construction of revenue cutters for United States service on the lakes. The explanations were satisfactory and the matter was dropped. The threatened confederate demonstrations from Canada upon the northern border led congress in 1864 to consider the necessity of abrogating the agreement of 1817, a step which Lord Lyons said the British government would view 'with great regret and no little alarm.' Notwithstanding this, Secretary Seward, under date of Oct. 24, 1864, notified the British government that it was apparent that Canada was being used as a basis for hostile operations against the United States and that, under the provision of the agreement of 1817 to that end, at the expiration of six months the United States would be at liberty to increase the naval armament upon the lakes. Nearly two months after the expiration of the six months Secretary Seward withdrew the notice of abrogation and by the consent of the two governments the agreement of 1817 was considered as still in effect."

In General.

Commander W. M. Folger, chief of the navy bureau of ordnance, will, on account of poor health, cease to be an officer of the navy on Jan. 2 next. President Harrison, in accepting Commander Folger's resignation, gave to him a letter reviewing his service in a most creditable manner.

One of the largest steel plates ever manufactured in this country has been rolled at the Pottstown iron company's works. It is 150 feet in length, twenty inches in width, and seven-sixteenths of an inch thick. It will be exhibited at the world's fair, and it will require three large cars to transport it.

The board of inspection of the United States navy has found why the engines of the Ranger have never worked properly. They were $1\frac{1}{2}$ inches higher than they should be, a mistake having been made in designing the bed plate. The Alert, a sister ship, has never developed the power expected and it is thought that her bed plate is also too high. It is surprising that the engines worked at all.

It is rumored that the Prince of Wales will visit the world's fair and that he will come in the royal yacht Osborne, which is of 1,500 tons and 3,300 horse power. The yacht will probably be escorted by a small squadron of British war vessels. If the Osborne can come and get through the Canadian canals and the Prince will give notice of his coming, the captains and engineers of some of our fast steel lake steamers might try a brush with the royal yacht.

The Maryland Steel Company, Sparrows Point, Md., proposes to construct shallow dry docks for the purpose of building vessels in them. Instead of launching them they would merely let the water into the dock and float them out. This would do away with strains caused by accidents in launching, and a permanent shed could be built over the dock to protect the men working on the boat in bad weather. It must be borne in mind, however, that the first cost of the dock as well as the expense of maintenance are important items.

The postmaster general has specified the following design for the flags to be flown from all steamers carrying United States mail: The pennant will be red, with a nine-inch blue border, 20 feet long, $8\frac{1}{2}$ feet at the head and 5 feet at the tail. In the upper left hand corner of the red field is an eagle in blue with arrows and olive branch in its talons, a red and white shield of stars and stripes covering the breast. "United States Mail" is in white on the red field. The F. & P. M. and the Booth Packing Company's fleet are about all the steamers that carry mail on the lakes.

The boilers of the Chicago, U. S. N., have brick furnaces; that is to say, they are return tubular boilers, set over furnaces, built up of iron and lined with fire bricks. This system was viewed with disfavor by English engineers and a prominent engineering paper of London declared them to be wholly impracticable, and said that the ship ought not to be allowed to go to sea. The Chicago has seen seven years service in waters all over the globe, and the furnaces are all right yet. The bottom plates of the boilers are somewhat corroded and will be removed, but nothing has been done or needs to be done to the furnaces.—The Engineer, New York.

MARINE REVIEW.

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

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The books of the United States treasury department contain the names of 3,600 vessels, measuring 1,154,870.38 tons in the lake trade. In classification of this fleet the lakes have more steamboats of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other sections of the country. The number of vessels of 1,000 to 2,500 tons on the lakes on June 30, 1891, was 310 and their aggregate gross tonnage 512,787.58; in all other parts of the country the number of this class of vessels was, on the same date, 213 and their gross tonnage 319,750.84. The classification of the entire lake fleet is as follows:

| Class. | Number. | Tonnage. |
|----------------------|---------|--------------|
| Steam vessels..... | 1,592 | 756,751.53 |
| Sailing vessels..... | 1,243 | 325,131.06 |
| Canal boats..... | 703 | 72,515.42 |
| Barges..... | 62 | 20,472.37 |
| Total..... | 3,600 | 1,154,870.38 |

Tonnage built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

| | No. of boats. | Net Tonnage. |
|------------|---------------|--------------|
| 1887..... | 152 | 56,488.32 |
| 1888..... | 222 | 101,102.87 |
| 1889..... | 225 | 107,080.30 |
| 1890..... | 218 | 108,515.00 |
| 1891..... | 204 | 111,856.45 |
| Total..... | 1,021 | 485,042.94 |

St. Mary's Falls and Suez canal traffic: Number of boats through St. Mary's Falls canal in 1890, 228 days of navigation, 10,557; tonnage, net registered, 8,454,435. Number of boats through Suez canal during 1890, full year, 3,389; tonnage, net registered, 6,890,014. Number of boats through St. Mary's Falls canal in 1891, 225 days of navigation, 10,191; tonnage, net registered, 8,400,685. Number of boats through Suez canal during 1891, full year, 4,207; tonnage, net registered, 8,698,777.

Entered at Cleveland Post Office as Second-class Mail Matter.

JAN. 12 IS the date fixed by the Duluth Chamber of Commerce for a waterways convention at Washington, in the interest of a ship canal through American territory from the lakes to the seaboard. All arrangements were made some time ago for the regular annual meeting of the Lake Carriers' Association in Detroit on the same date, and as this latter organization includes within its membership every vessel owner of prominence on the lakes, it will hardly be possible for any of its officers to attend the Washington meeting. This conflict of dates is certainly unfortunate, but it is to be hoped that the commercial organizations of the northwest, whose members are earnest advocates of the great canal project, will make a good showing by a full attendance at the capital. Mr. George H. Ely, who has been a leader for years in big measures tending to the advancement of lake commerce, will represent the Cleveland Board of Trade, and it is expected that Detroit and Chicago will also send influential delegates to the convention. If the Washington meeting is a success, one great object can be secured at once, and the meeting should limit itself to this single aim. Secure in the present session the passage of the Bentley bill calling for a survey for the canal, and two or three years' time will be saved in the furtherance of this great scheme, in which the whole country is bound to become interested before many more seasons of increasing commerce on the lakes have passed. The bill referred to calls for only a moderate appropriation, but if passed at the present session it will result in a saving of valuable time, as it will bring out an early report from a commission of government engineers placing the canal project on a tangible basis before the country.

MODESTY probably prompted Inspector General Dumont of the steamboat inspection service, to omit his own office, as well as that of the supervising inspectors, in recommending that

civil service rules be applied to the service. It may be in accordance with the decrees of custom, to reserve at least the head office in different branches of the government on the list of political appointments, but it is nevertheless certain, that the vessel interests of this country would not only be pleased with the recommendation that politics should no longer rule in local boards, but would also approve of an extension of civil service rules, to every official connected with the work of inspecting steam vessels, including the supervising inspector. No doubt Gen. Dumont would enter very heartily into a movement of this kind, and to be plain about it, the present head of the service would make a better officer if he was not compelled to do quite as much running around as at present in order to hold his job. Whatever may be said of him otherwise, it will be admitted that Gen. Dumont is a capable officer, thoroughly conversant with the present workings and needs of the service. His ability or desire under present conditions to bring about much needed reforms in the work is another question.

THE discussion attending a recent census report made by Mr. Swank, statistician in the iron and steel trades, on the production of Bessemer and open hearth steel brings out a few points of special interest to builders and owners of steel vessels. It is well known, of course, that in the construction of boilers the more uniform and reliable open hearth steel is used almost exclusively, but even in the most vital parts of ships the use of this furnace product is limited, on account of a material difference in cost. Although Mr. Swank's report shows that since the almost simultaneous advent of the two processes for steel making in the United States, the Bessemer per centage of the total product has been above 84, it also shows a gain of about 7 per cent. of the total for the open hearth process during the past ten years. This is taken as additional proof of the claim that all reported cases of mysterious failure of steel have been in the Bessemer product. It is now certain that in many cases Bessemer steel is specified against where it was formerly allowed. It is even true that while it is frequently employed in structural work, many engineers make a practice of barring it in their specifications.

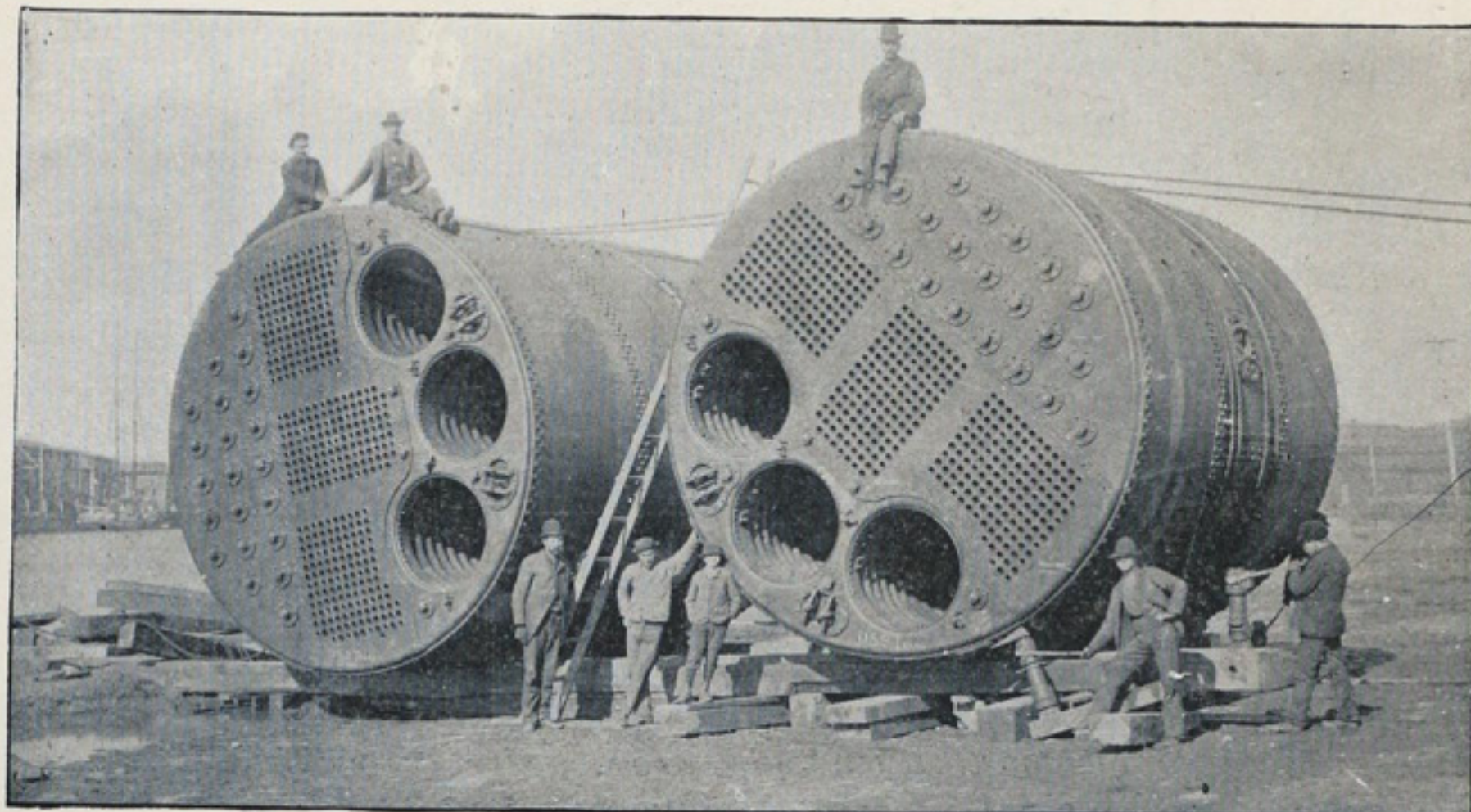
IN PURSUING, through recent requests made upon the state department, his investigation relative to advantages enjoyed by the Canadian Pacific Railway in shipping freight in bond through the United States, President Harrison shows a determination to follow up Canada's unjust action towards lake shipping in the matter of Welland canal tolls. If it had been the choice of the people of this country to continue the present administration for another four years, Canada would very probably have something more to contend with than the present meager system of retaliatory tolls at the St. Mary's Falls canal, and it is to be hoped that the work undertaken by President Harrison, which has no political significance as far as the wrong to American lake commerce is concerned, will be continued more vigorously by the new administration. The dominion officials were manifestly wrong in the position taken by them on this subject.

REPORTS regarding the proposed Society of Naval Architects and Marine Engineers are very encouraging. This society is entitled to earnest support from the shipping interests of the entire country, on account of the influence which it will have in forwarding the movement already begun for a new merchant marine. Washington L. Capps, 1710 F street, N. W., Washington, D. C., is secretary of the preliminary organization.

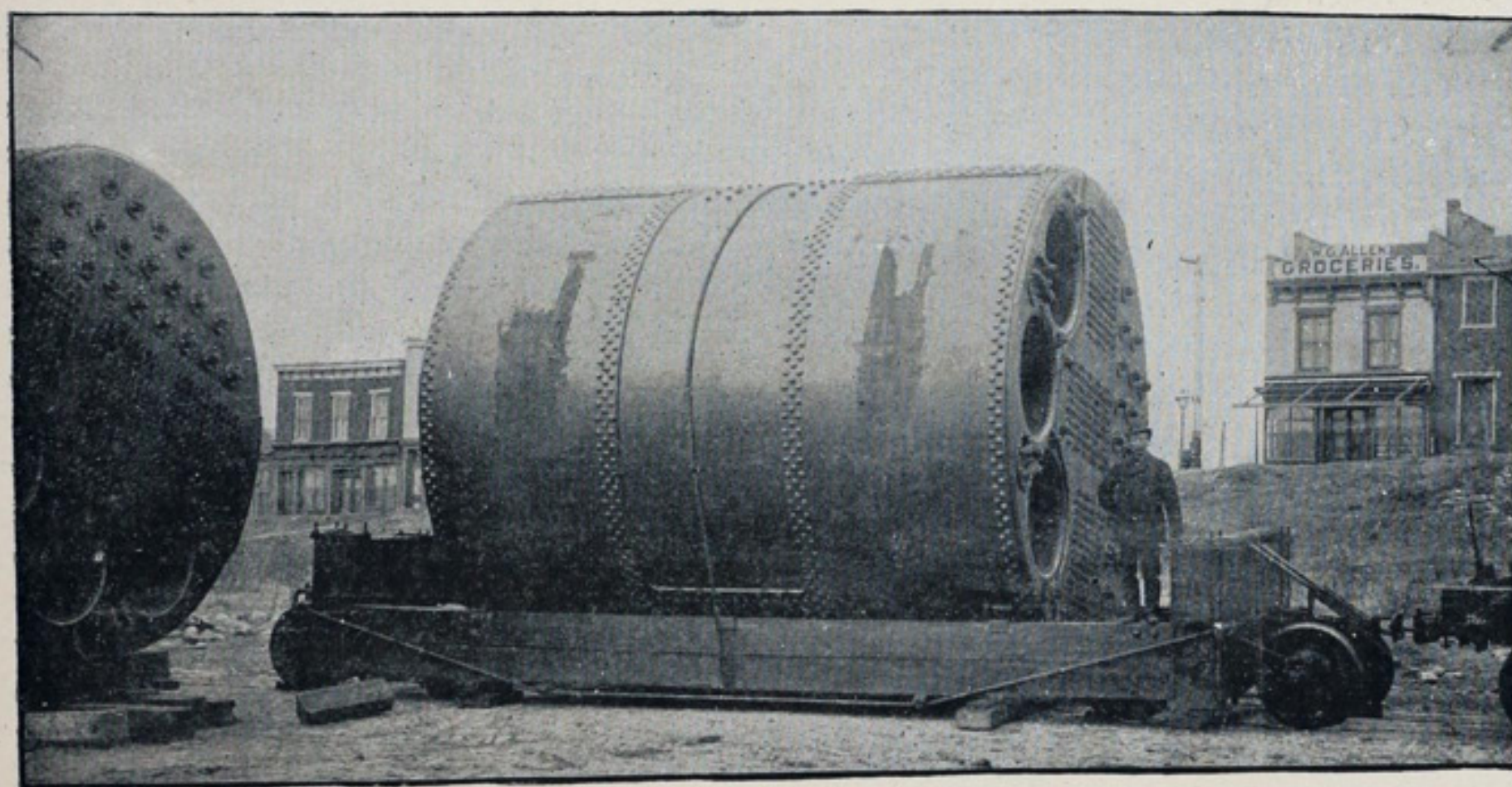
The Sewalls, well known ship builders of Maine, expect to turn out from their yard at Bath iron sailing vessels that will become as famous as the big wooden ships they have built of late years. They do not believe that the day of the sailing ship is past.

Boilers for a Battle Ship of 8,600 Horse Power.

The illustrations on this page are reproduced from photographs of the boilers of the United States battle ship Texas, a twin-screw vessel of 6,300 tons displacement and 8,600 horse power, carrying a main battery of eight guns. There are four boilers in all, each being 14 feet in diameter, 18 feet long and weighing 120,000 pounds when empty. Each boiler is provided with six corrugated fire-boxes, and the total capacity of the battery is 8,600 horse power. In the illustrations, Fig. 1 gives a very good idea of the general appearance and dimensions of the boilers, and Fig. 2 shows one of them mounted on a truck which was built specially for the purpose of transporting them from the works to the James river, a distance of about half a mile. These boilers were built by the Richmond Locomotive & Machine Works at Richmond, Va., at which point they were transferred to barges and towed to the Norfolk navy yard. The plan adopted for conveyance from the works to the river was successfully carried out, the truck answering in every way the purpose for which it was built. We are indebted to the Railway Review of Chicago for the engravings.



BOILERS FOR THE U. S. BATTLE SHIP TEXAS, FIG. 1.



BOILERS FOR U. S. BATTLE SHIP TEXAS. FIG. 2.

Drawings of the Chesapeake and Ohio Steamers.

For some time past the Chesapeake & Ohio Railway Company, or more properly the steamship company which is a part of that corporation, has been conducting negotiations with Clyde builders for the construction of six steamers to run between Newport News, Va., and England. It was announced a few days ago that negotiations were about to be closed, and the REVIEW wrote Mr. M. E. Ingalls, president of the Chesapeake & Ohio company, for copies of drawings of the new boats. His answer was as follows:

CHESAPEAKE & OHIO RAILWAY COMPANY,
OFFICE OF THE PRESIDENT,
CINCINNATI, O., Dec. 22, 1892.

Editor MARINE REVIEW:

DEAR SIR: -The drawings of our steamers were sent us, and the great and noble government demanded a large duty on them under the name of "paintings," and we kindly presented them

with the whole thing; therefore, we are without any blue prints or drawings. I suppose as works of art they were afraid they would demoralize the artists of this country and interfere with protected labor. As soon as my Democratic friends get into power and we have a reasonable tariff, I hope to get new drawings and will take pleasure in giving you the same.

M. E. INGALLS, President.

Mr. Ingalls is a leading manager of the affairs of the Vanderbilt railway system, being president also of the Big Four, or

Cleveland, Cincinnati, Chicago & St. Louis Railway. His political views, which are well known, prompted to some extent the tone of the above letter, but it is nevertheless disappointing that the company which he represents has not arranged to build some of its first steamers in this country. A contract of this kind, coming close upon the order for the Inman line steamers, would act as an incentive to American builders to aim to make their prices as low as those of foreign builders.

Case of Col. William Ludlow.

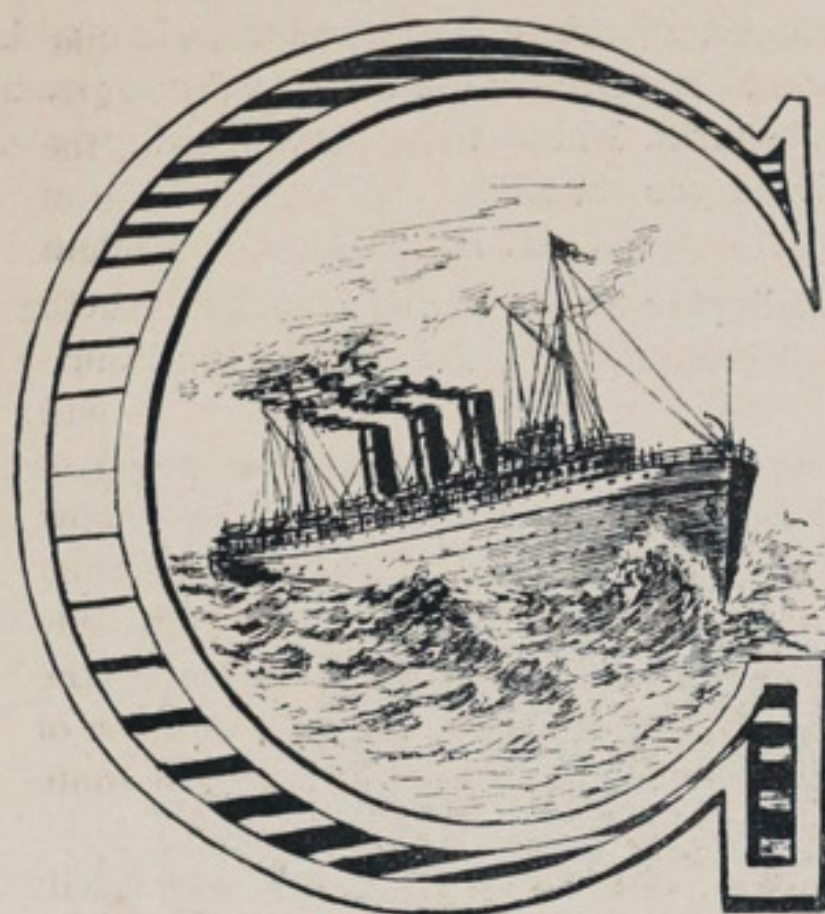
By order of the secretary of war, a court of inquiry will convene at Washington January 5, to consider the case of Col.

Ludlow, who was so unjustly treated by the light-house board. Col. Ludlow and his friends have not been idle, although a great deal has not been heard of this matter of late.

A Washington dispatch says: "As Secretary Foster did not care to override the light-house board, he decided that he would ask Secretary Elkins to order a court of inquiry. If this court finds the charge of insubordination well founded, a court-martial will naturally follow. If the charge is not sustained, the light-house board will swallow its report and take Colonel Ludlow back."

Secretary Foster has certainly not made friends among influential leaders in the lake marine who have taken a deep interest in this case. The matter should never have been shifted from the treasury-department, as the light-house board was declared to be in the wrong by all fair-minded people who gave attention to the case. There was also evidence that a spiteful personal feeling on the part of certain members of the board had most to do with the official action of that body.

Palatial Ships for the Lakes.



REAT NORTHERN is the name of a railway already famous throughout the country from the head of Lake Superior to the far northwest, and by the building of a fleet of passenger steamers equal in every respect to the finest Atlantic liners. James J. Hill, president of this railway line, proposes to not only control a very large share of the freight and passenger business across the en-

tire country from the Atlantic to the Pacific, but to eventually establish steamship lines on both oceans. These latter projects are matters of the future, but with this issue the REVIEW is enabled to present a supplemental photo-gravure illustration of one of the fleet of lake passenger steamers, two of which are now under construction at the ship yard of the Globe Iron Works Co., Cleveland. The engraving is a reproduction of a painting, prepared from drawings of the boats, and represents one of the big steamers passing up the Detroit river, opposite Woodward avenue, in the city of Detroit.

A glance at the picture shows a vessel entirely new to the lakes, as these steamers will cost no less than \$600,000 each and are patterned in every way after the best design of ocean-going passenger boats. They have already been described at some length, and it is sufficient to note here as regards dimensions that they are 360 feet keel, 380 feet over all, 44 feet beam and 34 feet deep. In the many new features as to boilers, engines, cabin arrangements and provision for lightening and increasing draft, the construction of these boats will, however, cause a great deal of discussion, as they will represent the latest practice known in ship building.

The service demands a boat capable of making 20 miles an hour, and in order to secure this speed builders and owners agreed upon quadruple expansion engines. In this respect they have taken a step in advance of builders of this country, at least, who have been discussing the question of the economical limit of the multiple expansion system, but who have not as yet applied the quadruple expansion type of engines to large steamers. It is interesting to note in this connection, however, that in bidding on the last two vessels of the United States navy, for which the contracts will be let shortly, the Messrs. Cramp of Philadelphia submitted proposals on plans of their own in addition to their bids on the plans of the navy, and in their own bids the principal change suggested by the famous Philadelphia builders was to substitute quadruple engines for the triple expansion engines proposed by the navy department. In this same connection it may be added that the Cramps will equip the new Inman line boats with quadruple engines.

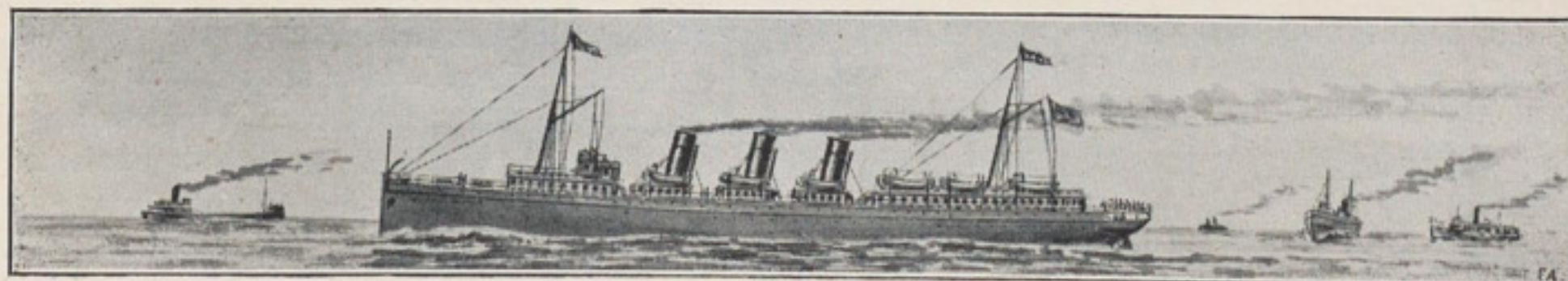
Each of these steamers will have two overhead cylinder vertical quadruple expansion engines, which will develop at least 7,000 horse-power. The high pressure cylinder is forward, followed by first and second intermediate and the low pressure. The sizes of these cylinders which have been given in the REVIEW, are 25, 36, 51½ and 74 inches, the stroke being 42 inches. The four crank shafts will be fixed at an angle of 45 degrees, and will consist of four interchangeable parts. The cylinders will face out-board, and will be supported by wrought columns, and forked cast columns behind with slipper guides. There will be piston valves throughout, and Joy valve gear. There will be one piston valve for high pressure cylinder, and all the others will have two each. With the exceptions of having one more cylinder, and being much more massive, the general appearance of the engines will be very much like that of the Comanche, illustrated in the REVIEW some time since. The air pumps and condenser will be independent. The air pump will be vertical, and have two single acting cylinders 36 inches diameter by 16 inches stroke.

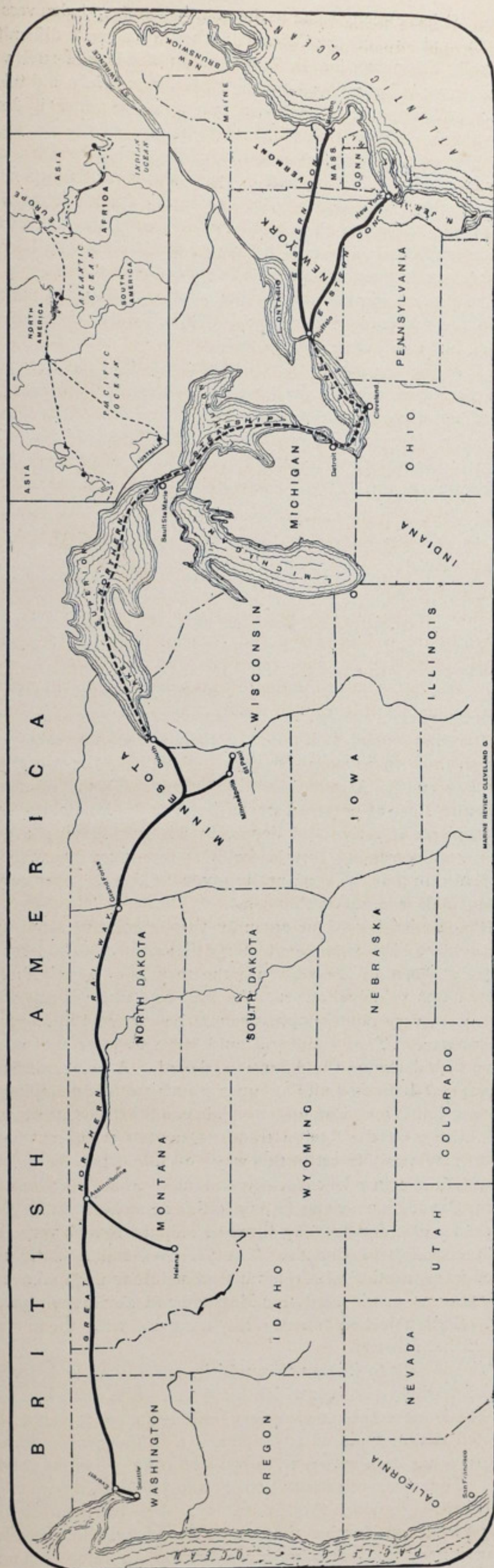
The twin screws will be arranged with brackets similar to those on the Goodrich line steamer Virginia, and will turn outwardly. The propeller wheels will be 13 feet diameter by 18 feet mean pitch. The steam will be furnished by 28 Belleville boilers at 195 pounds pressure, which, with the atmospheric pressure, equals 210 pounds. These boilers were fully described in the last issue of the REVIEW.

An idea of the massive proportions of the engines will be suggested by the weight of the bed plates, which will weigh 34 tons each. The low pressure cylinders will each weigh 24,000 pounds. The piston heads of the low pressure and second intermediate cylinders will be of cast steel.

There is, of course, no way of determining just what the fuel consumption of a big steamer of this kind would be on the very fast run of about 1,000 miles from Buffalo to Duluth, but such questions are always matters of gossip and it is estimated that the supply required for the trip will be 800 to 1,000 tons. In the engine room department it is probable that no less than sixty men will be required. These items of expense, together with the very heavy first cost of the steamers, and the fact that they will have little more than three months of profitable service during the summer season, with no revenue from freight, have caused considerable comment as to the success of this undertaking. This comment is, however, simply an expression of opinion which is certainly not based upon a thorough canvas of the subject. On the other hand a line of this kind has been talked of for years among railway managers and vessel owners well posted on the passenger business, and it is more than probable that Messrs. Hill, Gordon and their associates are thoroughly satisfied as to patronage. It is even hinted that their present business with connecting lines is sufficient assurance of success in this enterprise.

American capital and American material and workmanship will control every part of the building of these ships. All of the machinery and even the boilers, which are of French pattern, will be constructed by the Globe Iron Works Company. Of the material in the hulls, the angles will come from the Cleveland Rolling Mill Company, plate from the Otis Steel Company, and beams from the Pencoyd Iron Works.





GREAT NORTHERN RAILWAY AND STEAMSHIP ROUTE FROM THE ATLANTIC TO THE PACIFIC.

To Encircle the Globe.

Although the Canadian Pacific Railway, with its great line of Pacific steamers, has received subsidies and land grants aggregating upwards of \$200,000,000 from Great Britain and the Dominion government, and is now preparing to place a line of boats on the Atlantic, it is certain that the intention of President James J. Hill, of the Great Northern Railway and Northern Steamship Company, is to eventually compete with the big Canadian corporation in a railway and steamship system that will almost encircle the globe. A sectional drawing from a map of the United States, which accompanies this article, shows how the Great Northern Railway, with its eastern connections from all Atlantic seaport cities to Buffalo, and its lake steamship line and direct line of railway from the head of Lake Superior to the new town of Everett on Puget Sound, is already in possession of advantages over the Canadian Pacific as regards the best route over the American continent.

The fleet of six passenger steamers on the lakes, which will undoubtedly be the outcome of the present contract for the two vessels now under construction, will form the most important link in the system intended for competition with the Canadian line, as the monotony of the long trip across the country will be broken by a ride of more than 1,000 miles through the lakes on the most elegantly appointed ships afloat on fresh water. The policy of the Great Northern in building these vessels is, of course, along the plan adopted by the Canadian Pacific, when that company several years ago brought ship material from England and established its present line of fast steamers between Owen Sound, Ont., and Port Arthur at the head of Lake Superior. But in extending the lake route through the whole chain of waterways from Buffalo to Duluth, Mr. Hill has demonstrated, by actual competition with the Dominion railway, the advantages of the increased water haul in freight business, and is now preparing to do the same in the transportation of passengers.

With this railway in full working order to the Pacific, and complete passenger and freight connections on the lakes, there is no doubt that plans already considered for a steamboat line on the Pacific to China and Japan will be definitely arranged. Great Northern officials have repeatedly given expression to their intentions in this regard. Mr. Hill is very firmly of the belief that present indications are in the direction of a revival in American shipping and a great increase in the trade of this country with foreign nations. He is also of the opinion that with this revival in shipping will come a marked improvement in the ship building industry, and it is not at all unlikely that an early announcement will be made of his connection with the building up of some one of the present coast ship yards, or the establishment of a new plant on a big scale.

When a freight line of six big steel steamers was put into the lake trade by the Great Northern four years ago, it was openly declared that the line would not find an eastern connection from Buffalo. Still, this line of modern built boats not only found a surplus of business on account of the wonderful growth in all lines of lake trade, but has gained control of the traffic between St. Paul and Minneapolis and the seaboard, and in all arrangements regarding freight rates the management has demanded that rates from St. Paul and Minneapolis to the east should be the same as those from Chicago to the east. This is simply mentioned to show that advanced methods (big modern steamboats in this case, for instance) are a great ruling power.

A small map attached to the accompanying sectional map shows the enormous scope of the projects mapped out by these competing northwestern lines for control of international commerce. That the Northern Pacific is also planning for the establishment of fast steamboat connections there is no doubt. Numerous rumors have connected this company with negotiations for the construction of steamboats for the lakes as well as the Pacific.

Building of a Navy.

On March 4, 1889, there were in our navy only three modern steel vessels, with an aggregate tonnage of 7,863 tons, and mounting thirteen 6-inch and four 8-inch guns, the forgings for which last, as well as the shafting for the vessels, had been purchased from abroad, as they could not be made in this country. On the 4th of March next it is expected that there will be twenty-two modern vessels in commission, while nine additional vessels, none of which in speed, armor and armament has a superior in any foreign navy, promise to be ready for launching within the next twelve months. The nineteen vessels thus added to the navy in four years have an aggregate tonnage of 54,832 tons, mounting altogether two 12-inch, six 10-inch, sixteen 8-inch and eighty-two 6-inch guns, all of which, with the exception of five of the earliest, have been manufactured in this country. Three new steel tugs have also been constructed and put in service during this period.

Our new navy, including all vessels built or authorized, now consists of the following vessels: One sea-going battleship, first-class, Iowa; three coast-line battle ships, first-class, Massachusetts, Indiana, Oregon; two battle ships, second-class, Maine, Texas; six double-turreted harbor defense vessels, Puritan, Monterey, Miantonomoh, Monadnock, Terror, Amphitrite; two armored cruisers, New York, Brooklyn; one ram; two protected cruisers of extreme speed, Columbia, Minneapolis; fourteen cruisers, Olympia, Baltimore, Chicago, Philadelphia, San Francisco, Newark, Charleston, Boston, Atlanta, Cincinnati, Raleigh, Detroit, Montgomery, Marblehead; one dispatch vessel, Dolphin; six gunboats, Yorktown, Concord, Bennington, Machias, Castine, Petrel; one dynamite vessel, Vesuvius; one practice vessel, Bancroft; two torpedo boats, Cushing, No. 2, making a total of forty-two vessels.

The three first-class battle ships have a displacement of over 10,000 tons each, are protected by 18 inches of armor, carry 13-inch guns, and throw an aggregate of over three tons of projectiles at a single discharge. Among American inventions and manufactures which have been found of great value in equipping the new navy is Harveyized nickel steel for armor plates, said to be superior to any armor plate manufactured abroad. The manufacture of high pressure guns for the navy is now a home industry, and the navy department through its own agencies has developed a smokeless powder more effective than any manufactured in Europe. The manufacture of the Whitehead torpedo has been domesticated by the establishment of a factory at Brooklyn.

Gen. Poe Discusses the Twenty-foot Channel.

General Poe is very much pleased with the bids on the work of excavating the twenty-foot channel. He says: "My estimate of the entire cost of the project, which includes many other items besides the excavations, was \$3,340,000. The lowest bids on the sections aggregated approximately \$1,403,000, which leaves a margin for the other expenses of \$1,700,000. The delegates to the deep-water convention in Detroit a year ago thought the work could never be done inside of the estimate, but actual results have so far proved differently. Some people, too, have higgled at the cost of the project according to my estimate. Why, one of Uncle Sam's white hulled cruisers costs as much, and so far as real benefit to the country is concerned, the deep channel is double the value of the cruiser."

"But the harbors will have to be deepened, too, at a big extra expense."

"Yes, but that has nothing to do with the present project. As the need for deeper harbors becomes greater, the government will appropriate the necessary money. All the main harbors except Detroit and Port Huron will have to be improved, and I may say many of them need it even now, and regardless of a deep channel. I don't think much work will be done on the Chicago

harbor. It has already come to the point when deep-laden vessels move in and out of the Chicago harbor with great difficulty. Eventually the plants for the loading and unloading of such vessels will have to be removed out of the harbor entirely and taken to South Chicago or an adjacent point where water is deep. Every harbor on Lake Erie will have to be deepened.

"But aside from the necessity of deepening harbors, the deeper channel is going to prove of great benefit for the safe navigation of the rivers and shallow Lake St. Clair. They will cease to cut holes into themselves on the rocks, or stick in the mud for hours and days, and the danger of collision will be lessened, because in deep water a boat is under better control."

The general was asked what the prospects were for a connection to the seaboard, and replied: "It will come eventually I suppose, but I will never live to see it."

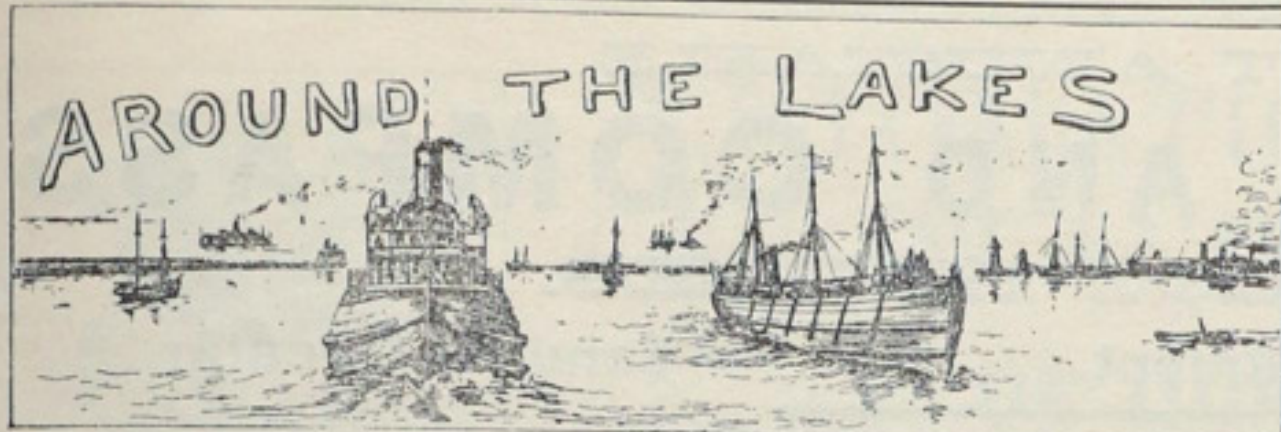
"I see by the papers there is a prospect that the new practice cruiser Bancroft will be brought to the lakes, to take the place of the Michigan. She is needed. The Michigan is old and slow, and a shot from an inch-bore Maxim rifle would pierce her through and through. There is no need to send her away, however, because of the treaty. She could be used on surveys."

Canada's Greatest Drawback.

The efforts being made by Canada to build up a great foreign trade are unremitting. Success may be accomplished by persistent effort. That country has, however, much to contend against in attaining this end. One of its greatest disadvantages is that for fully one-half of the year its St. Lawrence river ports are closed by ice. The ports on the Atlantic coast that are open throughout the winter season are few in number with possibly only two of them that have good facilities, and these limited for carrying on a foreign trade on an extensive scale. Practically the winter port of Canada on the Atlantic coast is Portland. From this seaport the regular lines of ocean steamers that run to Montreal during the open season arrive and depart in winter. Having a good harbor, and possessing certain facilities in connection with the Canadian railroads, it is naturally given preference over any of the Canadian seaports on that coast.

It is something of an anomaly that a country striving to increase its foreign commerce to large dimensions, should for six months at least of the year use the seaport of a neighboring country as its principal outlet. As long as Canada is dependent in this way, very rapid progress cannot be expected in respect of her commerce. That country should have a winter port within its own boundaries on the Atlantic seaboard. A great railroad is a very great help in building up a country and developing its resources, but it may also under certain conditions act as a retarding influence on the foreign trade. Canada's trans-continental railroad may possibly act in this way. While it may be to a certain extent a convenience locally to that country, may it not be making Canada a convenience as a quick route between England and the far east transporting through shipments with very little benefit accruing to Canada. The proposed fast Atlantic mail service in connection with this railroad points to as rapid a communication as possible between England and her eastern possessions. This object apparently is paramount with the management of that railroad.

The benefit to Canada through the opening up and development of territory through which the road runs is incidental to all this, but is nevertheless secondary, and being so, it is not to be expected that so rapid an advancement will take place within its borders as has been witnessed in our own country, where the first object of our trans-continental roads was the building up of the country through which their routes lay. Viewing it in this light it must be a considerable time before Canada will be sensible of any very great impetus being given her foreign trade because of any benefits that may come from the great railroad that traverses her territory.—*Maritime Register*.



Officers of the Ohio state board of health, the dairy and food commissioner, fish commission and game warden will combine to secure, if possible, at the coming session of the state legislature the passage of a law making gill net fishing unlawful.

G. G. Hadley, Toledo coal dealer, says the Ohio operators will certainly succeed in forming the big company, now projected for the purpose of handling all coal produced in the Hocking and other districts.

The Port Huron elevators have handled over 8,000,000 bushels of grain the past year, mostly from Lake Superior. Over 100,000 bushels are from Manitoba. There are now stored up at that port over 1,000,000 bushels of oats.

At the ship yard of C. C. Fowles, Fort Howard, Wis., the steamer Bennett has been caulked and has been given a new deck, and the Hart line steamer Welcome has been rebuilt. The tug Godfrey was rebuilt for the Green Bay Dredging Company, and the tug Laura Grasse received a larger engine.

The Milwaukee Mechanics' and the State Investment Insurance Company of San Francisco, refuse to pay their share of the loss, \$1,500 and \$1,000 respectively, on the propeller Remora, which burned to the water's edge last August. Owners of the boat have brought suit in the Wayne circuit court at Detroit.

The Collingwood (Ont.) Dry Dock and Ship Building Company will build a fish tug for Capt. W. A. Clark. The keel will be 78 feet, beam 15 feet and depth 7 feet six inches. The engines, to be built by the John Doty Engine Company, will be 12 and 22 inches by 14 inches stroke. The boat will be lighted by electricity and will carry 15 men.

Capt. James F. Shay, aged 53 years, and a lake sailor from boyhood, died at the Cleveland city hospital last week. His last position was mate of the Fred Kelley, several years ago. He was disabled for several years, and leaves a family in destitute circumstances. A subscription for them was started among lake captains.

Rieboldt, Wolter & Co., Sheboygan, Wis., will build for the Sheboygan Dredge and Dock Company a first-class dredge and two scows to cost \$30,000. This company has sufficient repair work to keep them busy all winter. The tug Gunderson Bros., launched from this yard recently is 75 feet long, 15 feet beam, 7 feet deep and has a 14 by 16-inch engine.

Ann Arbor No. 2, car ferry, steamed away from Craig's Toledo ship yard Sunday morning at 10 o'clock and arrived in Detroit six hours later, running, it is claimed, through ten inches of ice at the rate of fifteen miles an hour. The builders say the boat can break thirty inches of ice. No. 2 will ferry cars across Lake Michigan from Kewaunee to Frankfort, where a sister craft has been at work for some time.

J. W. McGraw, Bay City, seems to have been successful in his first venture in steamboat property, and has now purchased from Capt. James Davidson the boat No. 57, which is on the stocks in West Bay City. She is 304 feet keel, 330 feet over all, 45 feet beam and 26 feet deep, and is expected to carry 110,000 bushels of wheat out of Chicago and 90,000 from Duluth. She will be named Joseph W. McGraw for the purchaser's three-year-old son.

Tall masts are fast disappearing from lake steamers. The Lehigh boats Clyde, Fred Mercur, H. E. Packer, R. A. Packer, Oceanica and Tacoma and the Corrigan steamer Bulgaria are receiving short spars at Milwaukee. The Minnesota of the Inter-Ocean line is undergoing a like change, and other boats of that line will also sail with "stumps" next season. The masts of the Wiley M. Egan, John Plankinton and Veronica have also been supplanted with pole spars.

F. B. Case of Norwalk, O. has purchased all of the steamer J. C. Lockwood except the part owned by Capt. J. D. Peterson, Huron, on a basis of \$110,000 as the valuation of the whole boat. The Lockwood was built for J. C. Lockwood in 1889 by the Quayles of Cleveland. Mr. Case is also interested in the Keystone and Masten, and the Brown boat building by the Globe

Iron Works Company. He will have an office with Warner & Co., Perry Payne building, Cleveland, next season.

Proposals were opened last week at the office of Col. Smith, Cleveland, for the building of Fairport breakwater. Among the bidders were Martin Gilmore and John Stang, of Lorain, O., J. B. Donnelly of Buffalo, H. K. Gustin of Ann Arbor, Mich., and L. P. and J. A. Smith of Cleveland. On account of his low bids for timber, Col. Smith recommended that the contract be given to J. B. Donnelly, who furnishes hemlock for \$21 per thousand, white pine for \$32, white oak for \$35 and stone for \$5.70 per cord.

It is more than probable that as soon as telegraphic cable becomes cheap enough a number of lines will be laid through the lakes, to avoid constructing lines around these great bodies of water. The first extensive project of this kind will be undertaken by the Toledo, Ann Arbor & Northern Michigan Railway Company, which has recently begun operating two car ferries between Kewaunee and Frankfort. This company expects to lay a cable across Lake Michigan between the places named early next spring.

At the annual meeting of the Cleveland lodge of the Shipmasters' Excelsior Marine Benevolent Association, the following officers were elected: Capt. John Lowe, president; Capt. Joseph A. Holmes, first vice president; Capt. William Cumming, second vice president; Capt. Thomas Jones, treasurer; Capt. Frank Brown, financial secretary; Capt. W. C. Godsell, recording secretary. The other officers will be appointed by the president at the next meeting. The annual meeting of the grand lodge will be held at Port Huron next month.

Do You Want a Photograph of Your Steamer?

To accommodate subscribers who are anxious to secure photographs of lake steamers in which they are in any way interested the MARINE REVIEW has made a collection and is able to furnish 7x9 photographs, well mounted, of the following steamers at \$1 each. Write to the MARINE REVIEW, 516 Perry-Payne building, Cleveland, O.:

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| Chicago (Goodrich Line), | Manchester, | Shaw, John (schooner), |
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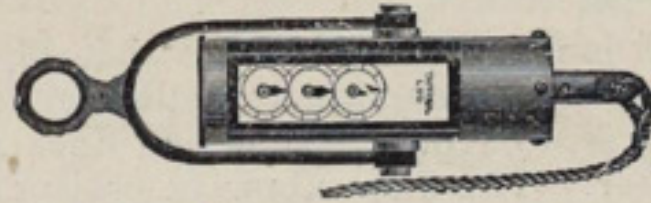
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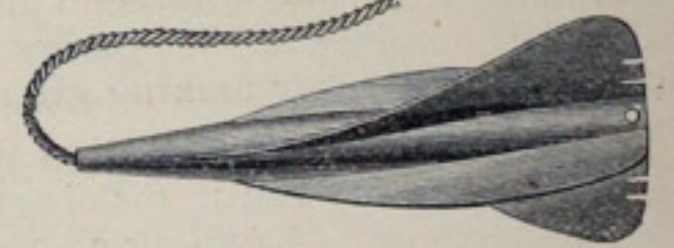
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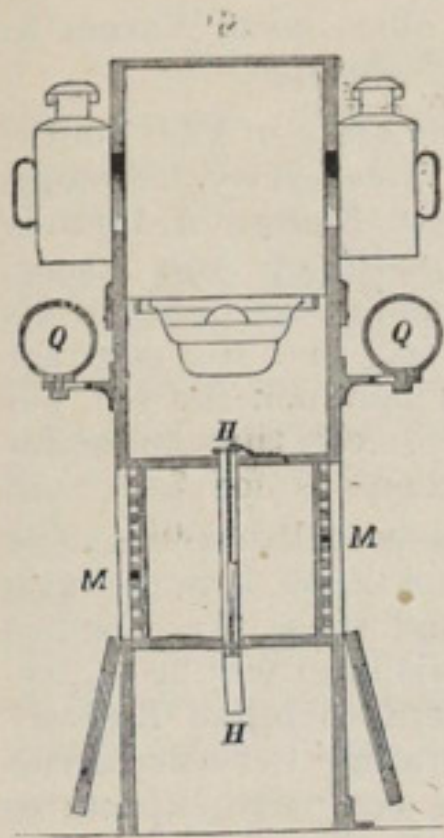


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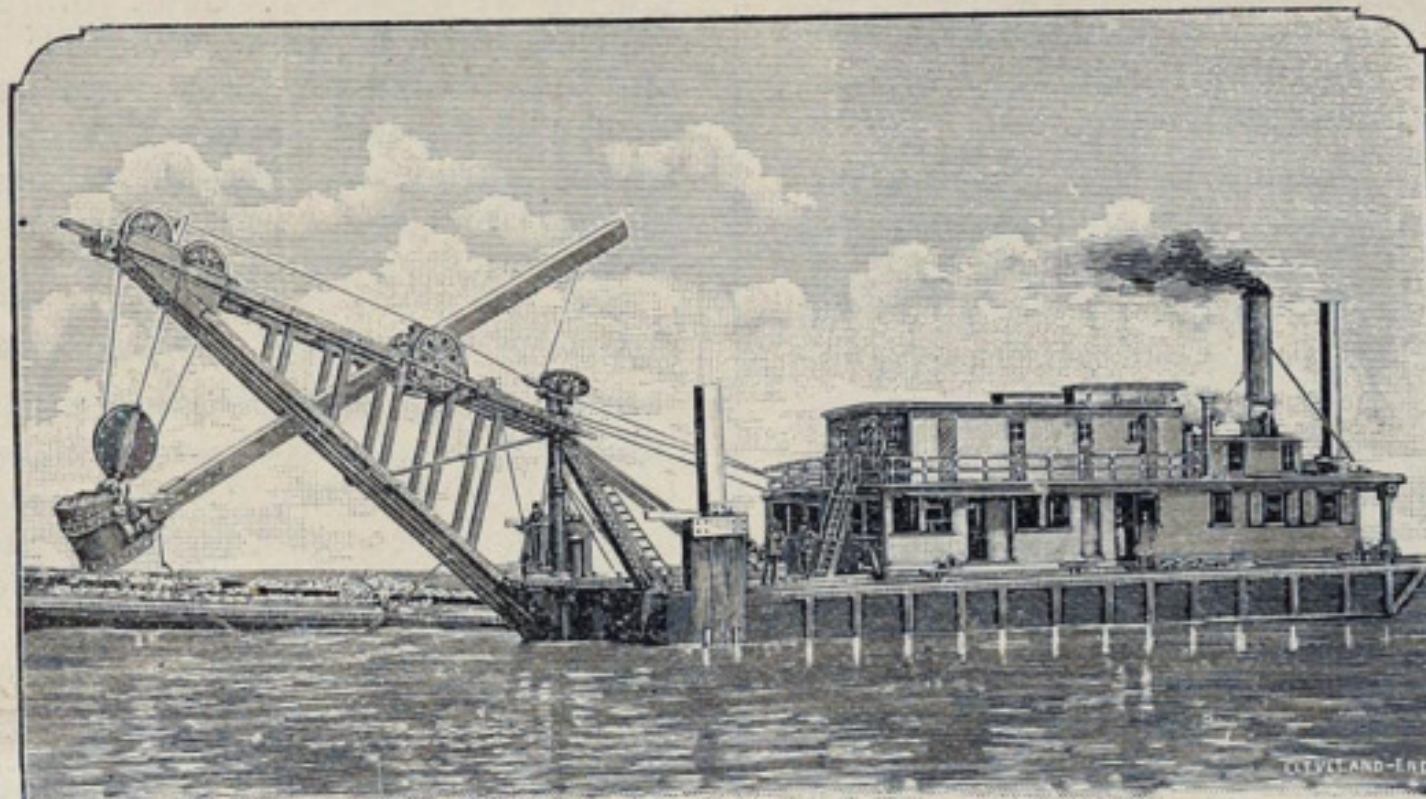
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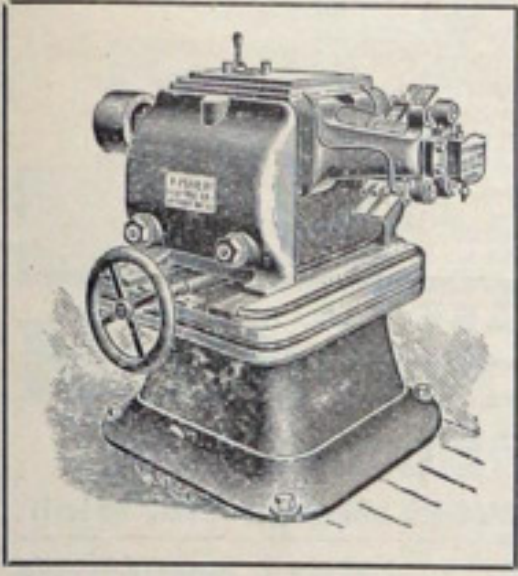
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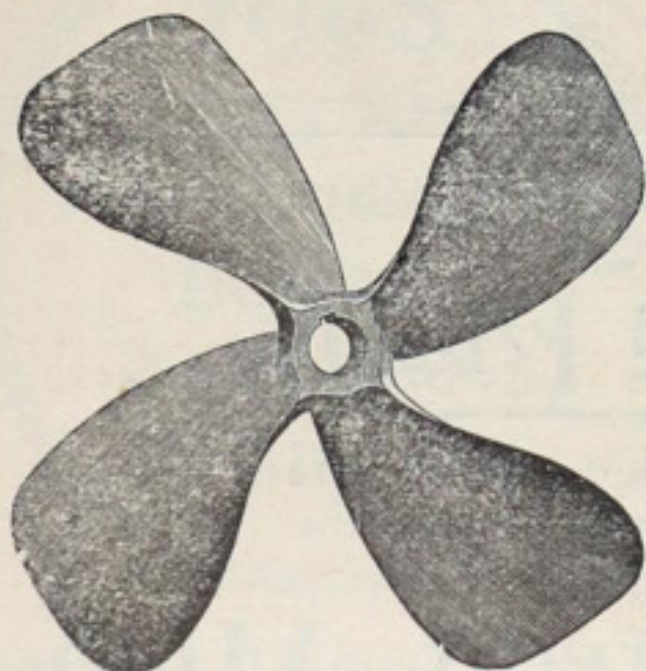
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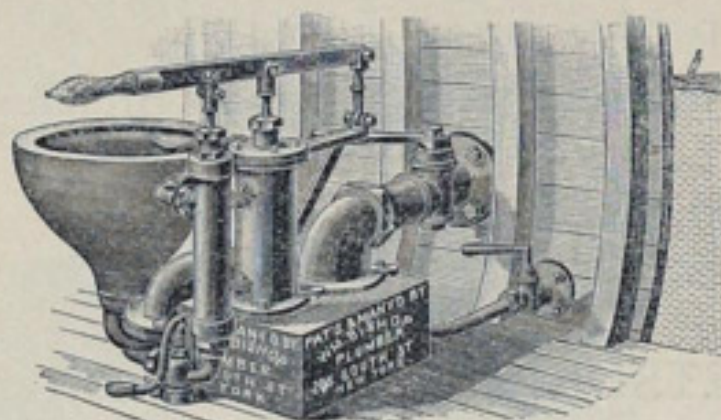
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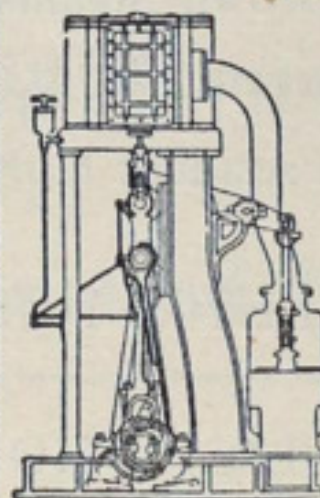
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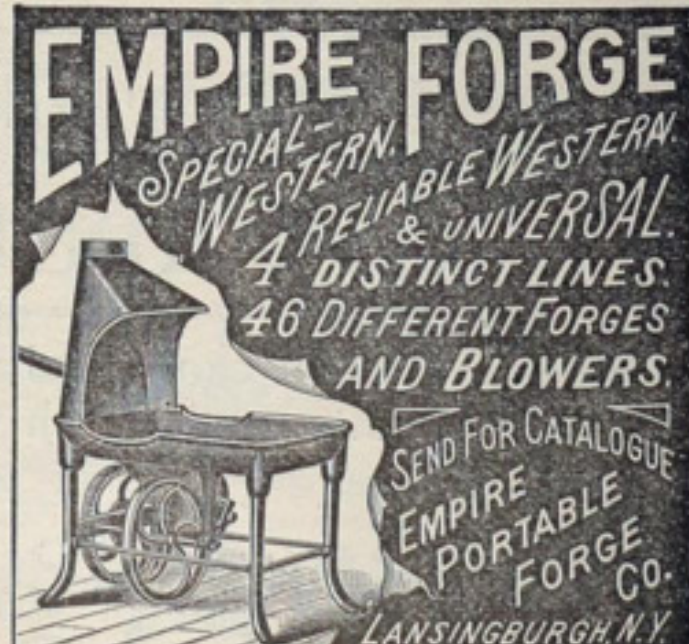
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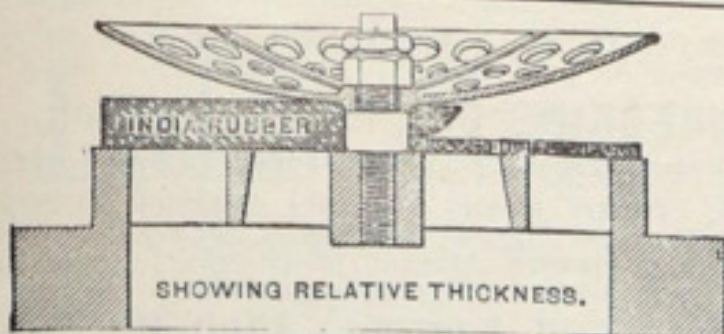
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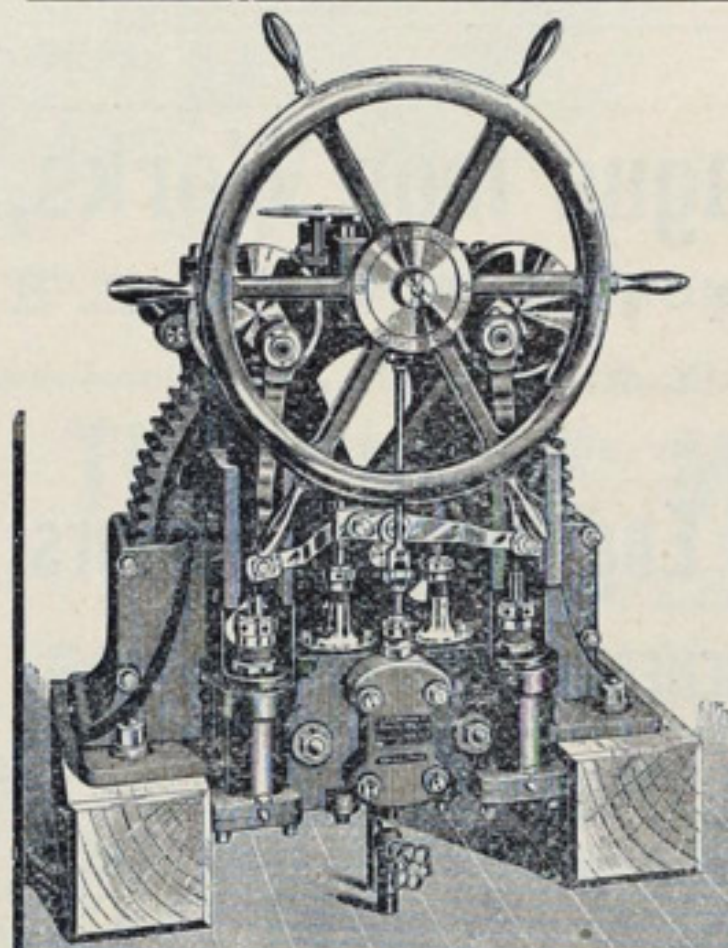
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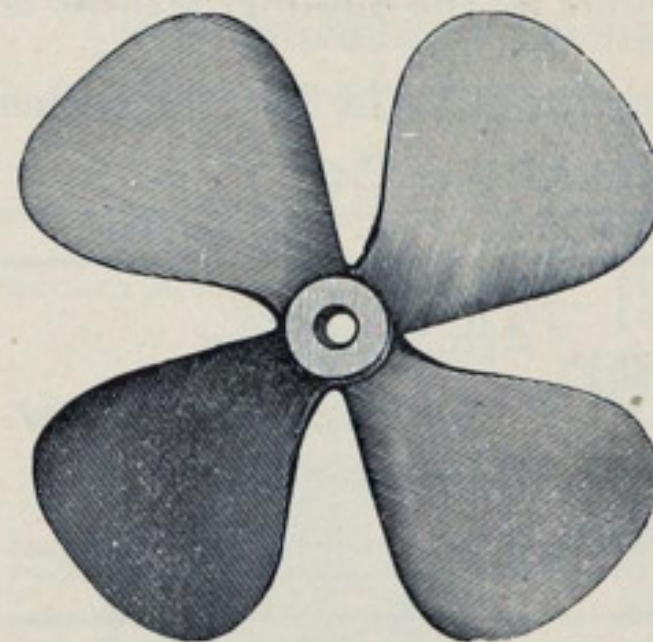
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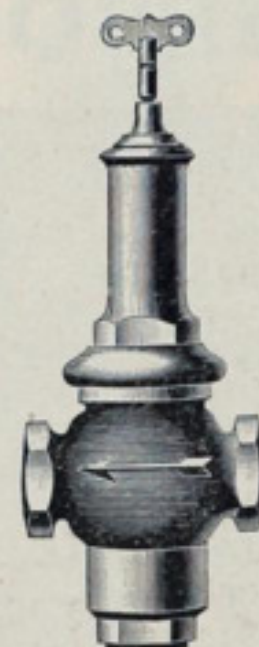
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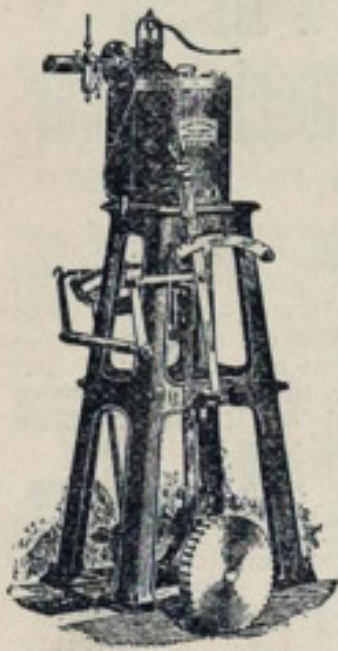
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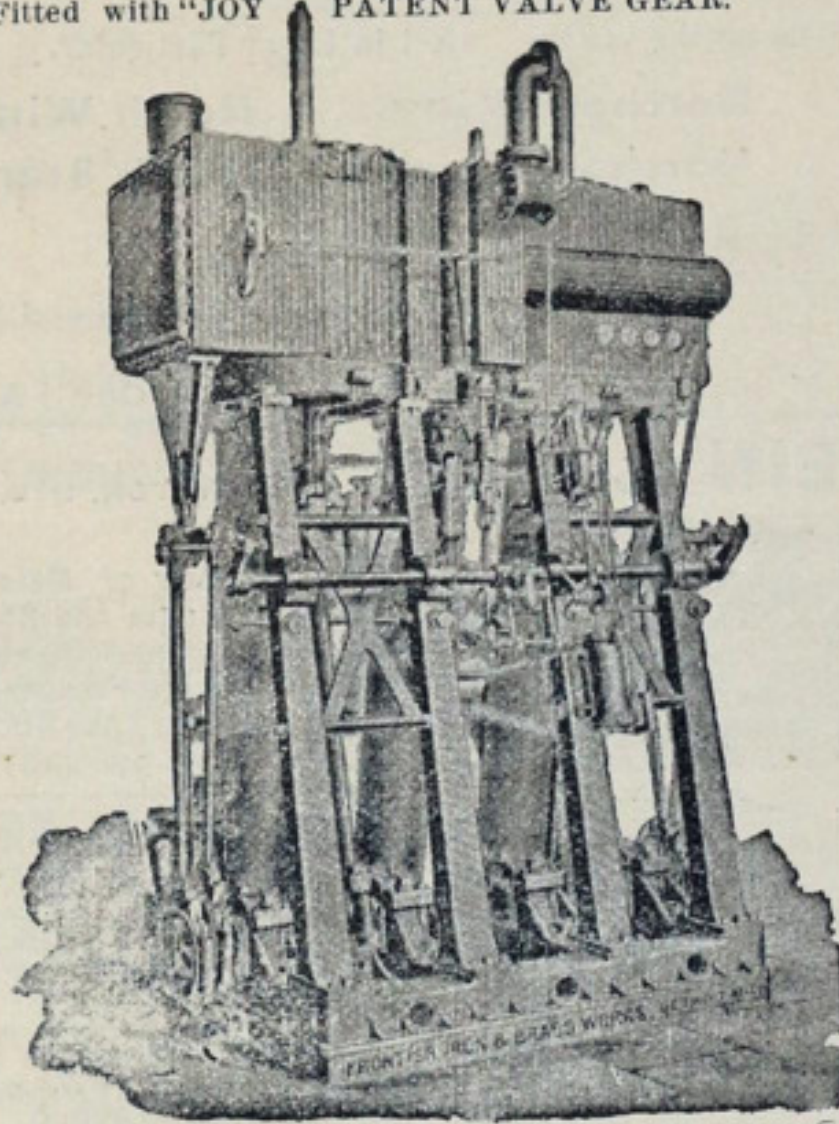
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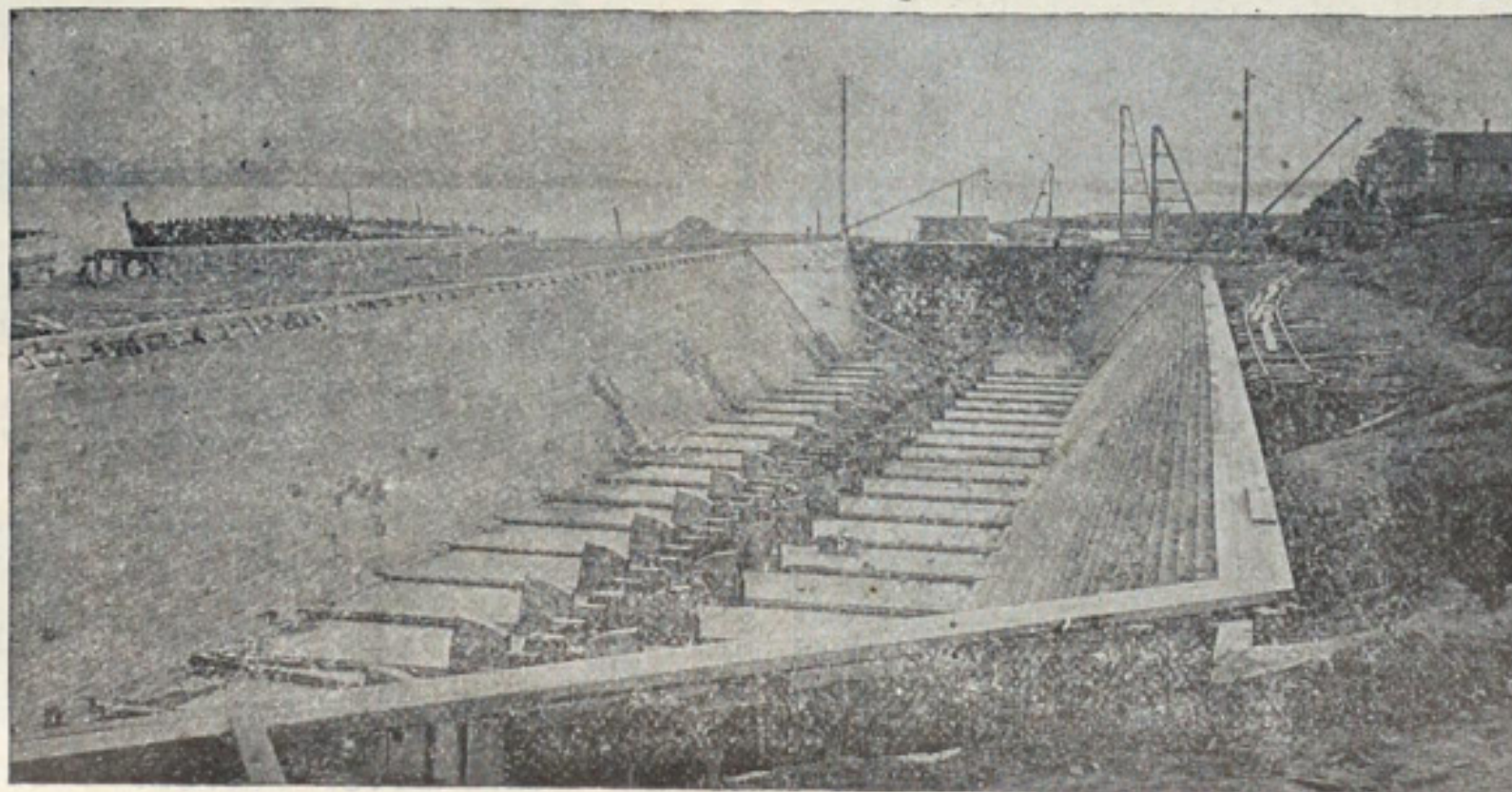
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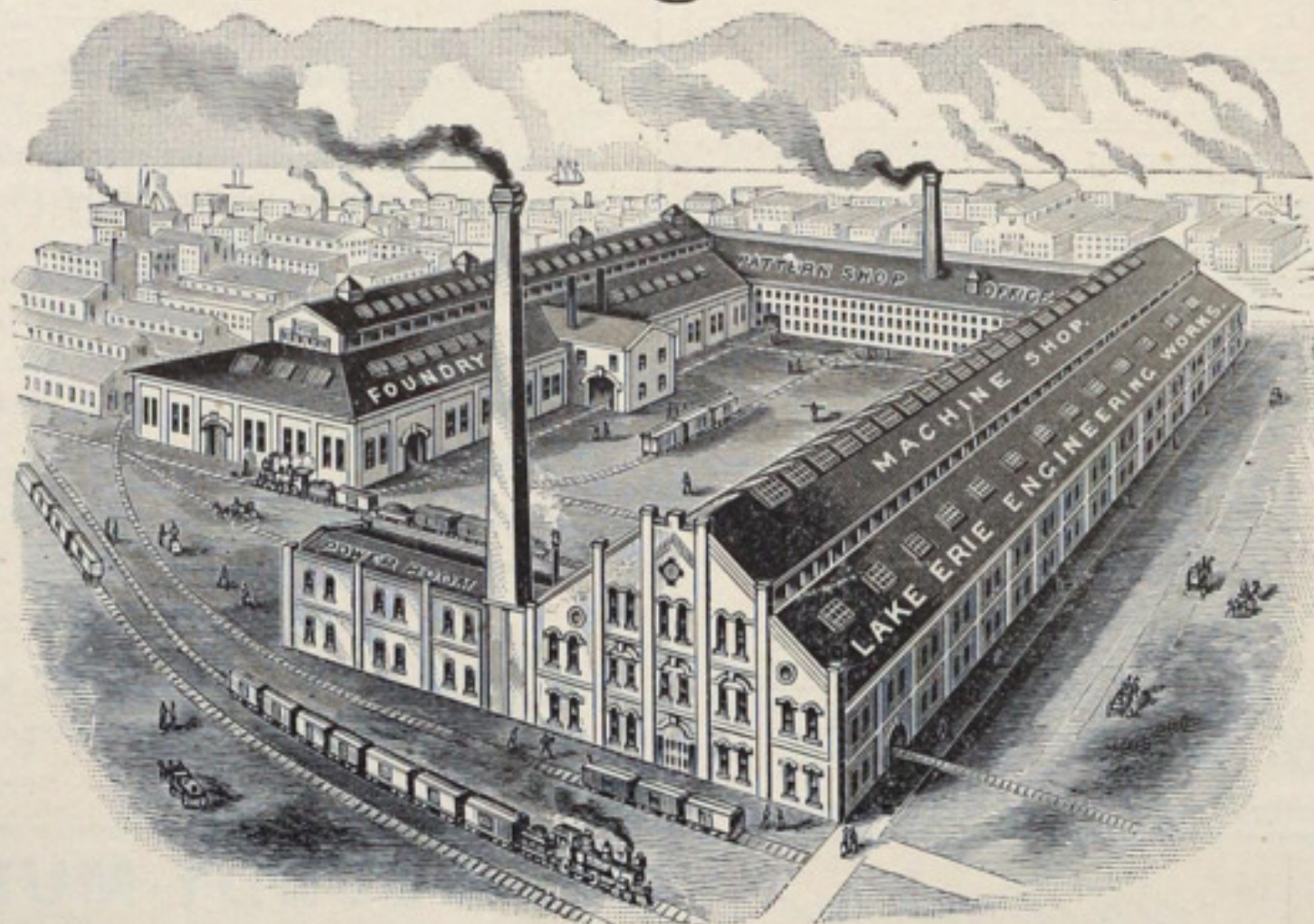
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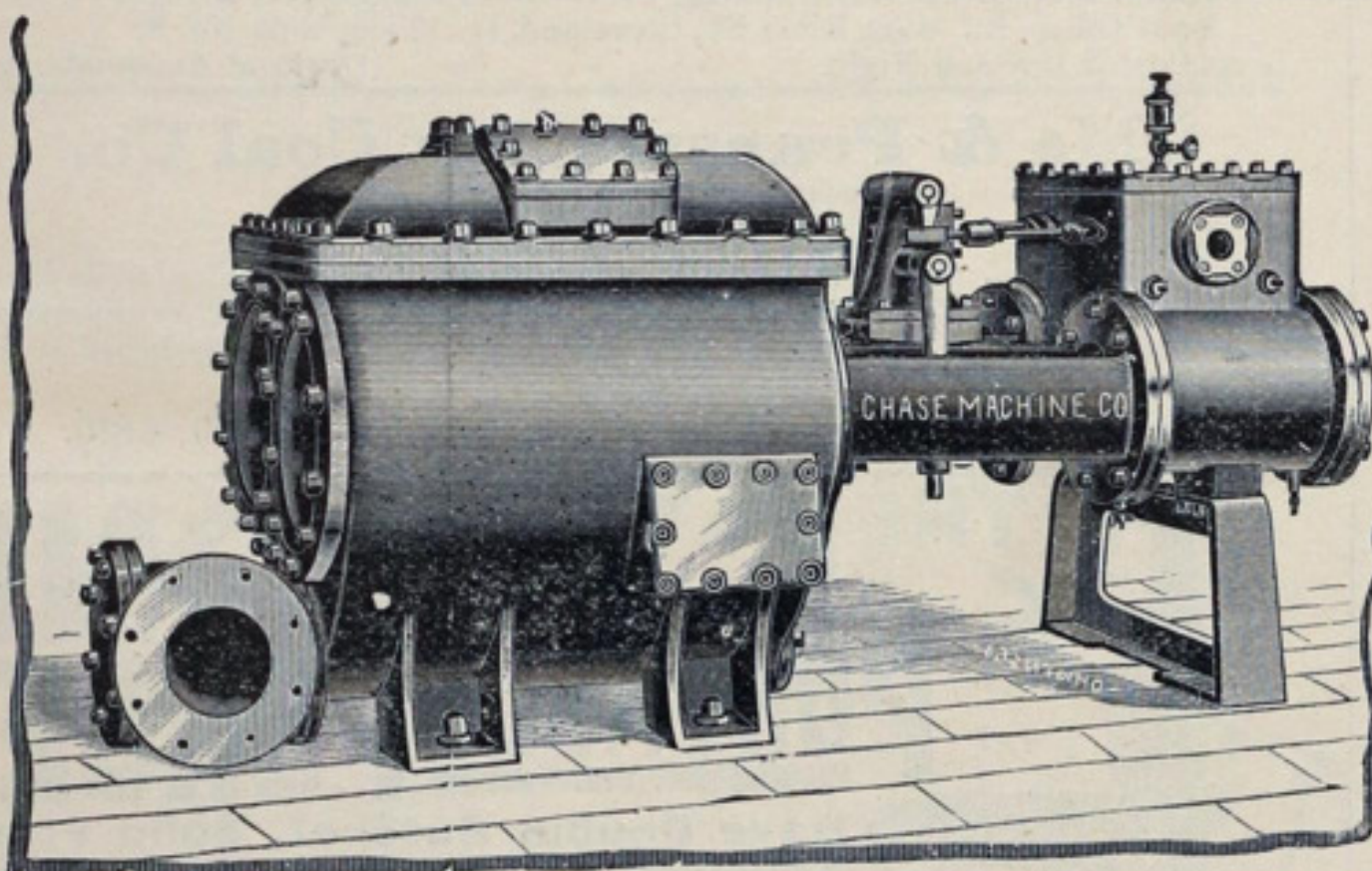
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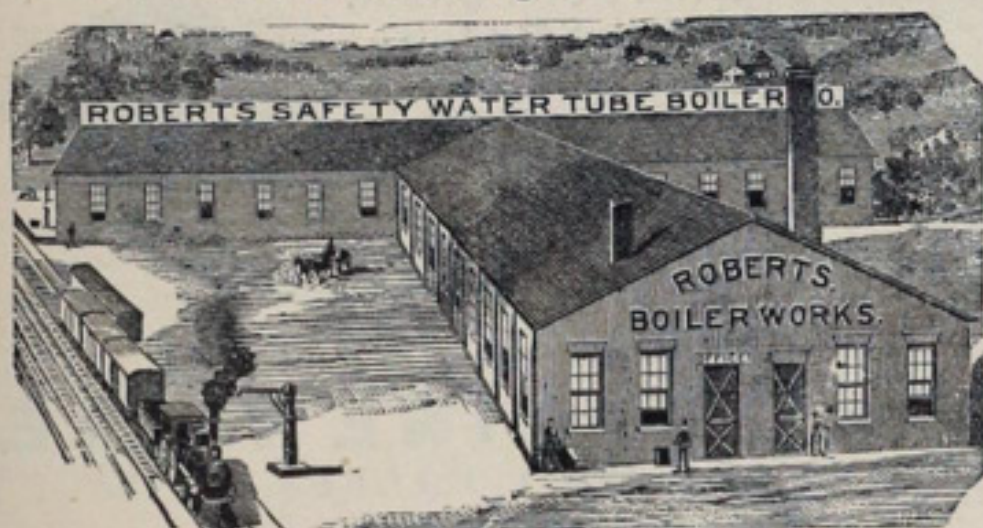
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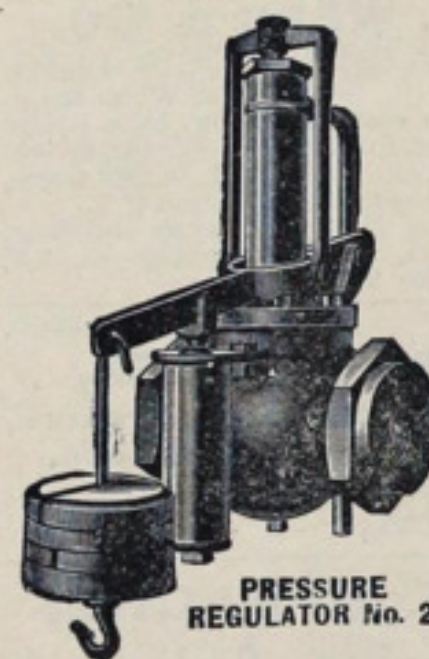
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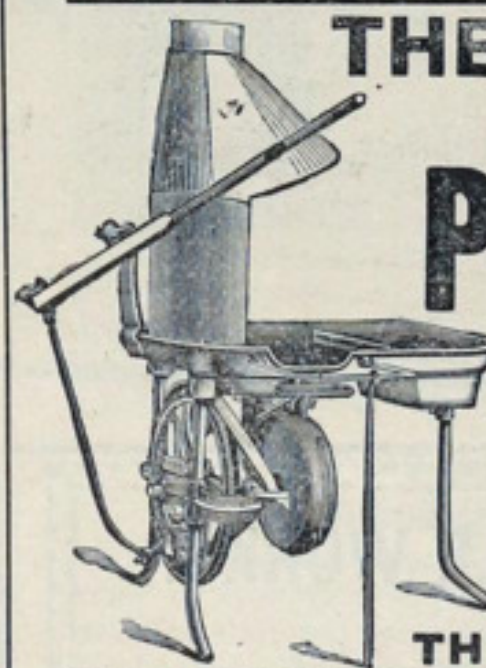
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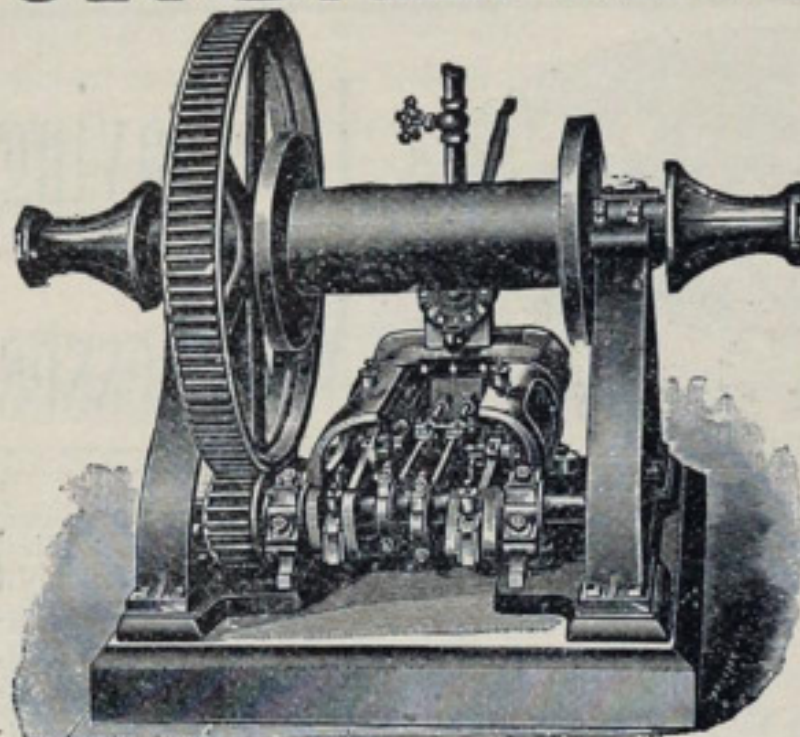
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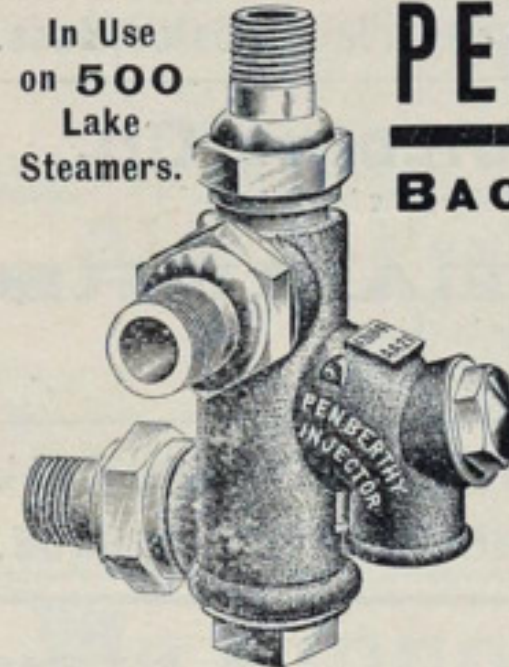
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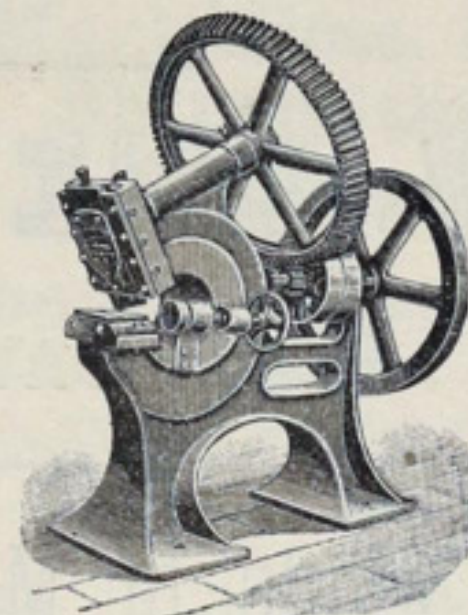
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